Maryland School Assessment-Mathematics:

Grades 3 through 8

Technical Report:
2008 Administration

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INTRODUCTION

The *Maryland School Assessment (MSA)* is a measure of students' reading and mathematics comprehension. The *MSA* fulfills recommendations of the Visionary Panel for Better Schools and meets the federal testing requirements of the *No Child Left Behind Act (NCLB)* of 2001.

New academic standards were designed to inform parents, teachers, and educators of what students actually learned in schools and to make schools accountable for teaching contents measured by the *MSA*. To this end, the Maryland State Department of Education (MSDE), in collaboration with hundreds of educators across the state, developed a series of math tests to measure students' achievement against the new academic standards.

In 2003, the MSA-Math was introduced in grades 3, 5, and 8; grades 4, 6, and 7 were added to the program in 2004.

The purpose of the 2008 *MSA-Math Technical Report* is to provide users and other interested parties with a general overview and statistical results of the MSA-Math.

The 2008 *Technical Report* is composed of four sections. The first section contains the following information:

- General overview and purposes of the MSA-Math
- Development and review of the 2008 MSA-Math items and test
- Test form design, test form specifications, item type, and item roles
- Test administration
- Operational item analyses
- Field test analyses
- Linking, equating, and scaling procedures
- Score interpretation
- Test validity
- Unidimensionality analyses
- Item bank construction
- Quality assurance

The second section provides the 2008 MSA-Math results for students in grades 3 through 8. It contains information about the cutoff score and pass rate at each performance level for the 2008 math tests.

After an overview of statistical summaries in the third section, the last section contains statistical summaries of the 2008 MSA-Math. This section outlines the statistical and psychometric characteristics of the 2008 MSA-Math.

Three appendices provide additional statistical results for the 2008 MSA-Math: Appendix A contains stratified random sampling results; Appendix B contains 2008 MSA-Math scale score histograms and Tukey charts; Appendix C contains both classical and Rasch (One-Parameter Logistic Item Response Theory) item parameters. The last appendix contains test blueprints for grades 3 through 8.

1. OVERVIEW OF THE 2008 *MARYLAND SCHOOL ASSESSMENT-MATHEMATICS*

In 2002, the Maryland State Department of Education (MSDE), in order to conform to the requirements of the new Federal program "No Child Left Behind," retired its award-winning *Maryland School Performance Assessment Program* and adopted a testing program known as the *Maryland School Assessment* (*MSA*). The new program, like its predecessor, was based on the *Voluntary State Curriculum*, which set reasonable academic standards for what teachers were expected to teach and for what students were expected to learn in schools.

In 2003, the MSA-Math was introduced in grades 3, 5, and 8, with grades 4, 6, and 7 being added to the program in 2004. It should be noted that in 2007, the MSA-Math was administered using a new vendor and applying a different IRT method (e.g., the Rasch model); therefore, a transformation of scale scores using equipercentile method was conducted in that year. Detailed information on scale score transformation can be found in Appendix C, *Year 2006 MSA-Math Recalibration Results from 3-PL IRT to the Rasch Model Using Equipercentile Method* in the 2007 *MSA-Math Technical Report*.

In 2007, MSDE decided to drop all of the SAT10 items from the 2008 assessment. Consequently, several SAT10 items which contributed to the 2007 criterion-referenced test (CRT) were replaced by Maryland-specific items in 2008. For the purpose of year-to-year linking and equating, operational selected-response (SR) items (i.e., multiple choice items) appeared both in 2008 and previous years were exclusively used. It should be noted that Rasch item difficulty parameters of the Maryland-specific items generated by recalibration of 2006 data were kept as fixed parameter during the 2008 linking and equating process. All scale scores of the 2008 assessment were linked back to the 2006 assessment so that all of the scale scores were on the same scale within each content and grade.

A Bookmark standard setting was conducted in 2003 to set proficiency level cut scores for grades 3, 5, and 8. Because 2004 was the first testing year for grades 4, 6, and 7, a second Bookmark standard setting was held in summer 2004 to set cut scores for these additional grades. The performance level cut scores were used to assign students to three proficiency levels (Basic, Proficient, and Advanced) for AYP reporting under the "No Child Left Behind" act. Information about the Bookmark procedures and results can be obtained from MSDE. It should be noted that these cut scores have been applied since 2003 (grades 3, 5, and 8) and 2004 (grades 4, 6, and 7).

1.1 Purposes/Uses of the 2008 MSA-Math

By measuring students' achievement against the new academic standards, the 2008 MSA-Math fulfills two main purposes. First, the MSA-Math was designed to inform parents, teachers, and educators of what students actually learned in schools by providing specific feedback that can be used to improve the quality of schools, classrooms, and individualized instructional programs, and to model effective assessment approaches that can be used in classrooms. Second, the MSA-Math serves as an accountability tool to measure performance levels of individual students, schools, and districts against the new academic standards.

1.2 The Voluntary State Curriculum

Federal law requires that states align their tests with their state content standards. MSDE worked carefully and rigorously to construct new tests to provide a strong alignment as defined by the U.S. Department of Education.

The *Voluntary State Curriculum* (*VSC*), which defined what students should know and be able to do at each grade level, helped schools understand the standards more clearly, and included more specificity with indicators and objectives. The format of the *VSC* specified standards statements, indicators, and objectives. Standards are broad, measurable statements of what students should know and be able to do. Indicators and objectives provide more specific content knowledge and skills that are unique at each grade level.

The objectives assessed by the MSA at each grade level are embedded in the *VSC*. In addition, they are identified with the notation, ***assessment limit***. Assessment limits provide clarification about the specific skills and content that students are expected to have learned for each assessed objective. Even though some objectives in the VSC may not have an Assessment limit at a given grade-level, these non-assessed objectives still must be included in instruction. They introduce important concepts in preparation for assessed skills and content at subsequent grade levels.

The following provides one example of assessment limit of Grade 3 MSA-Math:

STANDARD 1.0

Knowledge of Algebra, Patterns, and Functions

TOPIC:

A. PATTERNS AND FUNCTIONS

INDICATOR:

1. Identify, describe, extend, and create numeric patterns and functions

OBJECTIVES:

a. Represent and analyze numeric patterns using skip counting

Assessment limits:

Use 2, 5, 10, or 100 starting with any whole number (0 – 1000)

It should be noted that it was not the case that every indicator would necessarily be tested each year even if 100% of the standards should be tested. Consequently, the *VSC* specified curricular indicators and objectives that contributed directly to measuring content standards, which were aligned to the MSA. More information on assessment limits and standards can be found in appendix D, *The 2008 MSA-Math Blueprint*.

1.3 Development and Review of the 2008 MSA-Math Items and Test

The development of the 2008 MSA-Math test required the involvement of four groups in addition to MSDE and Pearson. These groups are as follows:

National Psychometric Council

The National Psychometric Council (NPC) took a major role in reviewing and making recommendations to MSDE on the development and implementation of the 2008 MSA-Math program. For example, they made recommendations to MSDE on issues, such as test blueprints, operational form construction, field test design, item analysis, item selection for scoring purposes, linking, equating and scaling issues, and other relevant statistical and psychometric issues.

Content Review Committee

Content Review Committee members ensured that the MSA-Math was appropriately difficult and fair. Committee members were either specialists in math for test items, or experts in test construction and measurement. They represented all levels of education as well as the ethnic and social diversity of Maryland students. Committee members were from different areas of the state.

The educators' understanding of Maryland curriculum and extensive classroom experience made them a valuable source of information. They reviewed test items and forms and took a holistic approach to ensure that tests were fair and balanced across reporting categories.

Bias Review Committee

In addition to the Content Review Committee, a separate Bias Review Committee examined each item on math tests. They looked for indications of bias that would impact the performance of an identifiable group of students. Committee members discussed and, if necessary, rejected items based on gender, ethnic, religious, or geographical bias.

Vision Review Committee

A Vision Review Committee reviewed the items and any associated art for bias to the visually impaired. The committee makes their recommendations to NOT put any item they had a concern with on Form A.

Table 1.1 identifies responsibilities of each group in developing the 2008 MSA-Math test.

Table 1.1 The 2008 MSA-Math Responsibility for Test Development

Development of the 2008 MSA-Math	Primary Responsibility
Development of Preliminary Blueprints and Item Specifications	Pearson; MSDE; NPC
Development of Operational Form Requirement and Session Blueprint	MSDE
Item Writing	MSDE; Pearson
Item Review	Pearson; MSDE; NPC; Content Review Committee
Bias Review	Pearson; MSDE; Bias Review Committee
Vision Review	Pearson: MSDE; Vision Review Committee
Modification of Special Forms	Pearson; MSDE
Review of Special Forms	MSDE
Construction of Operational Test Forms	Pearson; MSDE; NPC
Construction of Field Test Forms	Pearson; MSDE
Review of Operational Test Forms	MSDE
Final Construction of Test Forms	Pearson; MSDE

1.4 Test Form Design, Specifications, Item Type, and Item Roles

Test Form Design

The MSA-Math test had two forms of operational items at each grade. Field test items were embedded within the operational items resulting in a total of 10 test forms at each grade. As can be seen from Table 1.2, Forms A, B, C, D and E are identical with respect to operational items (designated as operational Form A) and differ only with respect to field test items. This is also true for Forms F, G, H, J, and K (designated as operational Form F).

Table 1.2 The 2008 MSA-Math Test Form Design: Grades 3 through 8

	Operational Item Sets		Field test Item Sets									
	A	F	A	B	C	D	E	F	G	H	J	K
Form A	X		X									
Form B	X			X								
Form C	X				X							
Form D	X					X						
Form E	X						X					
Form F		X						X				
Form G		X							X			
Form H		X								X		
Form J		X									X	
Form K		X										X

Note. Forms A, B, C, D, and E (Form A) are identical, and Forms F, G, H, J, and K (Form F) are identical in terms of operational test items.

Test Form Specifications and Reporting Category

Tables 1.3, 1.4, and 1.5 provide information on the total number of operational items included in each operational test form and how these items were broken down based on each content standard. It should be noted that the test specifications in these tables represent the targeted test design for each grade and show the targeted distribution of each content standard.

Mathematics has a total of seven content standards (Algebra, Geometry, Measurement, Statistics, Probability, Numbers and Computation, and Process). It should be acknowledged that some standards were combined for purposes of reporting subscale. Specifically, the Geometry and Measurement standards and Statistics and Probability standards were combined to produce a total of five subscale reporting categories. Tables 1.6 through 1.23 provide information on the actual distribution of score points by standard and reporting category. The number of items and score points for each reporting standard were identical across forms within each grade.

Item Types

The 2008 MSA-Math included four types of items: *selected response (SR), student-produced response (SPR), brief constructed response (BCR), and extended constructed response (ECR)*.

SR items require students to select a correct answer from several alternatives. For the 2008 MSA-Math, students selected an answer from four options. Each *SR* item was scored dichotomously (i.e., 0 or 1).

SPR items require students to record their answers on a grid by shading in circles corresponding to the numbers in their answer. For the 2008 MSA-Math, only grade 7 and 8 tests included *SPR* items. Each *SPR* item was scored dichotomously.

BCR items require students to provide a short answer using words, numbers, and/or symbols, while *ECR* items require students to write an answer that consists of more information than is required for a brief constructed response item.

Both *BCR* and *ECR* items consist of Step A and Step B. Step A contributes to the content score while Step B contributes to the process score. Each step was considered as an independent item and separately scored;

All *BCR* and *ECR* Step A items received a 0-1 score point range from two independent scorers; all *BCR* Step B items received a 0-2 score point range; all *ECR* Step B items received a 0-3 score point range from two independent scorers. The score given was the higher of the first and the second Reader's scores, provided they were adjacent. A resolution reader's score was used if two non-adjacent initial scores were received. That is, the resolution reader's score was used in place of both the first and second Reader's scores. It should be noted that grade 3 and 4 tests did not include *ECR* items.

The Role of Operational SR Item

Most SR items were used for both form-to-form and year-to-year calibration and linking. As a result, operational SR items fell into one of the following four categories: unique core, common core, unique core linking, and common core linking items. First of all, it should be noted that form-to-form linking was conduced with both the common core and the common core linking items. Form-to-form calibration and linking procedures can be found in section of chapter 1.10, *Form-to-Form Linking Procedures*. More importantly, however, year-to-year linking was conduced with only the core linking items and year-to-year linking procedures on these core linking items can be found in section of chapter 1.10, *Year-to-Year Linking Procedures*.

While unique core items appeared on either operational form A or F, common core items appeared on both forms. As a result, only the common core items were used for form-to-form linking. Because the core items were not included into the possible 2008 linking pool, on the other hand, item parameters of these items were recalibrated with the 2008 live, operational data and then reserved in the 2008 Maryland item bank for the possible use as core linking items in the future. Classical and Rasch analyses on these core items can be found in section of chapter 1.7, *Validation Check with the 2008 Core Items*.

While a few core linking items appeared only on operational form (i.e., unique core linking), most core linking items (i.e., common core linking) appeared on both operational forms. As a result, the common core linking items were used for both form-to-form and year-to-year linking. The unique core linking items were used only for year-to-year linking.

The role of the core linking items was to place the 2008 scale on the 2006 scale. Because these core linking items carried their operational item parameters on the 2006 scale, they were included in the 2008 year-to-year linking pool. Classical analysis on these items can be found in section of chapter 1.7: *P-Value Check with Year-to-Year Core Linking Items*, and calibration, linking and equating procedures on these core linking items can be found in chapter 1.10, *Linking, Equating, and Scaling Procedures of the 2008 MSA-Math*.

The Role of Operational SPR, BCR, and ECR Items

SPR, BCR, and ECR items were divided into one of the following two categories: unique core or common core items. Only the common items were used for form-to-form calibration and linking. Because these items were not included in the 2008 year-to-year linking pool, new Rasch item and step difficulty parameters were estimated with the 2008 live, operational data set. These new item and step difficulty parameters were used to produce each student's theta estimate. More detailed information about how much these items changed in terms of classical and Rasch item difficulty can be found in section of chapter 1.7, *Validation Check with the 2008 Core Items*.

Table 1.3 Item Type of Content Standard for the 2008 MSA-Math: Grades 3 and 4

Grade	Strand Title	Item Type	No. of Items in Each Form
3	Total CRT	*SR*, *BCR*	65
	Algebra	*SR*, *BCR*	13
	Geometry	*SR*, *BCR*	8
	Measurement	*SR*, *BCR*	7
	Statistics	*SR*, *BCR*	12
	Probability	*SR*	2
	Number Computation	*SR*, *BCR*	16
	Process	*BCR*	7
4	Total CRT	*SR*, *BCR*	64
	Algebra	*SR*, *BCR*	14
	Geometry	*SR*, *BCR*	7
	Measurement	*SR*, *BCR*	7
	Statistics	*SR*, *BCR*	8
	Probability	*SR*, *BCR*	7
	Number Computation	*SR*, *BCR*	14
	Process	*BCR*	7

Note. *SR* items are selected-response items, and *BCR* items are brief constructed response items. Form A designates forms A, B, C, D, and E. Form F designates forms F, G, H, J, and K.

Table 1.4 Item Type of Content Standard for the 2008 MSA-Math: Grades 5 and 6

Grade	Strand Title	Item Type	No. of Items in Each Form
5	Total CRT	*SR*, *BCR*, *ECR*	65
	Algebra	*SR*, *BCR*, *ECR*	15
	Geometry	*SR*, *BCR*	6
	Measurement	*SR*, *BCR*	8
	Statistics	*SR*, *BCR*	9
	Probability	*SR*, *BCR*	4
	Number Computation	*SR*, *BCR*	15
	Process	*BCR*, *ECR*	8
6	Total CRT	*SR*, *BCR*, *ECR*	62
	Algebra	*SR*, *BCR*, *ECR*	14
	Geometry	*SR*, *BCR*	8
	Measurement	*SR*, *BCR*	6
	Statistics	*SR*, *BCR*	9
	Probability	*SR*, *BCR*	4
	Number Computation	*SR*, *BCR*	14
	Process	*BCR*, *ECR*	7

Table 1.5 Item Type of Content Standard for the 2008 MSA-Math: Grades 7 and 8

Grade	Strand Title	Item Type	No. of Items in Each Form
7	Total CRT	*SR, SPR, BCR, ECR*	62
	Algebra	*SR,SPR, BCR, ECR*	14
	Geometry	*SR, SPR, ECR*	7
	Measurement	*SR, SPR, BCR*	6
	Statistics	*SR, SPR, BCR, ECR*	9
	Probability	*SR, SPR, BCR*	5
	Number Computation	*SR, SPR*	14
	Process	*BCR, ECR*	7
8	Total CRT	*SR, SPR, BCR, ECR*	62
	Algebra	*SR,SPR, BCR, ECR*	14
	Geometry	*SR, SPR, ECR*	7
	Measurement	*SR, SPR, BCR*	6
	Statistics	*SR, SPR, BCR, ECR*	9
	Probability	*SR, SPR, BCR*	5
	Number Computation	*SR, SPR*	14
	Process	*BCR, ECR*	7

Table 1.6 Item Distribution of Each Content Standard for the 2008 MSA-Math: Grade 3

Form	Total Item Number of Each Standard							**Total # of Item**
	1*	2*	3*	4*	5*	6*	7*	
A	13	8	7	12	2	16	7	**65**
F	13	8	7	12	2	16	7	**65**

Note. 1*. Algebra; 2*. Geometry; 3*. Measurement; 4*. Statistics; 5*. Probability; 6*. Numbers and Computation; 7*. Process

Table 1.7 Total and Reporting Content Standard Scores for the 2008 MSA-Math: Grade 3

Form	Total and Reporting Standard Scores					
	1	2&3	4&5	6	7	**Total Score**
A	13	15	14	16	14	**72**
F	13	15	14	16	14	**72**

Table 1.8 Item Type and Score Point Distribution for the 2008 MSA-Math: Grade 3

Form	# of SR Item	# of BCR Item		**Total # of Item**	Scores of SR	Scores of BCR		**Total Score**
		Step A	Step B			Step A	Step B	
A	51	7	7	**65**	51	7	14	**72**
F	51	7	7	**65**	51	7	14	**72**

Table 1.9 Item Distribution of Each Content Standard for the 2008 MSA-Math: Grade 4

Form	Total Item Number of Each Standard							**Total # of Item**
	1*	2*	3*	4*	5*	6*	7*	
A	14	7	7	8	7	14	7	**64**
F	14	7	7	8	7	14	7	**64**

Note. 1*. Algebra; 2*. Geometry; 3*. Measurement; 4*. Statistics; 5*. Probability; 6*. Numbers and Computation; 7*. Process

Table 1.10 Total and Reporting Content Standard Scores for the 2008 MSA-Math: Grade 4

Form	Total and Reporting Standard Scores					
	1	2&3	4&5	6	7	**Total Score**
A	14	14	15	14	14	**71**
F	14	14	15	14	14	**71**

Table 1.11 Item Type and Score Point Distribution for the 2008 MSA-Math: Grade 4

Form	# of SR Item	# of BCR item		**Total # of Item**	Scores of SR Item	Scores of BCR		**Total Score**
		Step A	Step B			Step A	Step B	
A	50	7	7	**64**	50	7	14	**71**
F	50	7	7	**64**	50	7	14	**71**

Table 1.12 Item Distribution of Each Content Standard for the 2008 MSA-Math: Grade 5

Form	Total Item Number of Each Standard							**Total # of Item**
	1*	2*	3*	4*	5*	6*	7*	
A	15	6	8	9	4	15	8	**65**
F	15	6	8	9	4	15	8	**65**

Note. 1*. Algebra; 2*. Geometry; 3*. Measurement; 4*. Statistics; 5*. Probability; 6*. Numbers and Computation; 7*. Process

Table 1.13 Total and Reporting Content Standard Scores for the 2008 MSA-Math: Grade 5

Form	Total and Reporting Standard Scores					
	1	2&3	4&5	6	7	**Total Score**
A	15	14	13	15	17	**74**
F	15	14	13	15	17	**74**

Table 1.14 Item Type and Score Point Distribution for the 2008 MSA-Math: Grade 5

Form	# of SR Item	# of BCR Item		# of ECR Item		**Total # of Item**	Scores of SR	Scores of BCR		Scores of ECR		**Total Score**
		Step A	Step B	Step A	Step B			Step A	Step B	Step A	Step B	
A	49	7	7	1	1	**65**	49	7	14	1	3	**74**
F	49	7	7	1	1	**65**	49	7	14	1	3	**74**

Table 1.15 Item Distribution of Each Content Standard for the 2008 MSA-Math: Grade 6

Form	Total Item Number of Each Standard							**Total # of Item**
	1*	2*	3*	4*	5*	6*	7*	
A	14	8	6	9	4	14	7	**62**
F	14	8	6	9	4	14	7	**62**

Note. 1*. Algebra; 2*. Geometry; 3*. Measurement; 4*. Statistics; 5*. Probability; 6*. Numbers and Computation; 7*. Process

Table 1.16 Total and Reporting Content Standard Scores for the 2008 MSA-Math: Grade 6

Form	Total and Reporting Standard Scores					
	1	2&3	4&5	6	7	**Total Score**
A	14	14	13	14	15	**70**
F	14	14	13	14	15	**70**

Table 1.17 Item Type and Score Point Distribution for the 2008 MSA-Math: Grade 6

Form	# of SR Item	# of BCR Item		# of ECR Item		**Total # of Item**	Scores of SR	Scores of BCR		Scores of ECR		**Total Score**
		Step A	Step B	Step A	Step B			Step A	Step B	Step A	Step B	
A	48	6	6	1	1	**62**	48	6	12	1	3	**70**
F	48	6	6	1	1	**62**	48	6	12	1	3	**70**

Table 1.18 Item Distribution of Each Content Standard for the 2008 MSA-Math: Grade 7

Form	Total Item Number of Each Standard							**Total # of Item**
	1*	2*	3*	4*	5*	6*	7*	
A	14	7	6	9	5	14	7	**62**
F	14	7	6	9	5	14	7	**62**

Note. 1*. Algebra; 2*. Geometry; 3*. Measurement; 4*. Statistics; 5*. Probability; 6*. Numbers and Computation; 7*. Process

Table 1.19 Total and Reporting Content Standard Scores for the 2008 MSA-Math: Grade 7

Form	Total and Reporting Standard Scores					
	1	2&3	4&5	6	7	**Total Score**
A	14	13	14	14	17	**72**
F	14	13	14	14	17	**72**

Table 1.20 Item Type and Score Point Distribution for the 2008 MSA-Math: Grade 7

Form	# of SR Item	# of SPR Item	# of BCR Item		# of ECR Item		**Total # of Item**	Scores of SR	Scores of SPR	Scores of BCR		Scores of ECR		**Total Score**
			Step A	Step B	Step A	Step B				Step A	Step B	Step A	Step B	
A	36	12	4	4	3	3	**62**	36	12	4	8	3	9	**72**
F	36	12	4	4	3	3	**62**	36	12	4	8	3	9	**72**

Table 1.21 Item Distribution of Each Content Standard for the 2008 MSA-Math: Grade 8

Form	Total Item Number of Each Standard							**Total # of Item**
	1*	2*	3*	4*	5*	6*	7*	
A	15	8	5	9	5	12	8	**62**
F	15	8	5	9	5	12	8	**62**

Note. 1*. Algebra; 2*. Geometry; 3*. Measurement; 4*. Statistics; 5*. Probability; 6*. Numbers and Computation; 7*. Process

Table 1.22 Total and Reporting Content Standard Scores for the 2008 MSA-Math: Grade 8

Form	Total and Reporting Standard Scores					
	1	2&3	4&5	6	7	**Total Score**
A	15	13	14	12	19	**73**
F	15	13	14	12	19	**73**

Table 1.23 Item Type and Score Point Distribution for the 2008 MSA-Math: Grade 8

Form	# of SR Item	# of SPR Item	# of BCR Item		# of ECR Item		**Total # of Item**	Scores of SR	Scores of SPR	Scores of BCR		Scores of ECR		**Total Score**
			Step A	Step B	Step A	Step B				Step A	Step B	Step A	Step B	
A	34	12	5	5	3	3	**62**	34	12	5	10	3	9	**73**
F	34	12	5	5	3	3	**62**	34	12	5	10	3	9	**73**

1.5 Test Administration of the 2008 MSA-Math

The 2008 MSA-Math test was administered to all students in grades 3 through 8. Pearson coordinated test administration procedures with MSDE prior to implementation. This chapter was prepared to provide general information about the 2008 test administration. Detained information about the 2008 test administration can be obtained from the 2008 Test Administration and Coordination Manual (TACM) and Examiners Manual (EM) which are available from either MSDE or Pearson.

Test Materials

All test materials had to be stored in a secure location prior to test administration. The School Test Coordinator (STC) provided test administration training and test materials to the test examiners. The Daily Testing Materials Tracking Record (or an equivalent form designed by the LEA) was used to track the distribution and return of Test Books.

Before testing began, the Test Examiners (TEs) carefully inventoried all test materials given to them, as they were accountable for the return of all secure materials at the end of testing. The TEs checked to ensure they have all the materials they needed for testing.

For the Test Examiner, Pearson provided the following materials:

- Examiner's Manual- Math

For each student, the following materials were provided by Pearson:

- Test/Answer Book
- Special accommodations testing materials, if necessary

For each student, the following additional materials were provided by school or student:

- Two No. 2 pencils with erasers
- Blank scratch paper
- Calculator (all grades)
- Classroom ruler with both U.S. customary and metric measurements (all grades)
- Classroom protractor for grades 5 through 8
- Classroom compass for grades 7 and 8 only

Each classroom used for the assessment also needed the following additional materials:

- Sign for the door reading "Testing: Do not Disturb"
- Digital clock or a watch, or clock with a second hand
- Copy of the Scoring Service Identification Document (SSID) Header Sheet

Two test-related Examiners Manuals (EMs) were developed for the 2008 MSA: one version for reading and the other for mathematics for use in all grades 3-8. Developed in partnership with

MSDE, the EMs contained instructions for preparation and administration of the test. In addition to the EMs, one Test Administration and Coordination Manual (TACM) was developed for use by the Local Accountability Coordinators (LAC) and building-level School Test Coordinators (STC). Included in this manual were instructions for preparation of materials for testing, monitoring of testing, and packaging of materials for return to Pearson for scoring. The TACM was distributed and reviewed during a workshop in January for STCs and LACs, with duplicates sent to each school along with its testing materials.

Test Administration Schedule

The primary test window for MSA was established by MSDE (April 1-10, 2008, with make-up testing held April 11-16, 2008). However, each Local Education Agency (LEA) set a specific schedule for administration of the MSA within that window for their district. For a given grade and content area, all testing had to take place on the same schedule. Each LEA schedule was submitted to MSDE in advance and approved for each district by the State. For example, all Grade 3 Mathematics must be administered on the same days throughout the LEA. In addition, each content area at each grade was tested on two days during the window.

The MSA-Math testing schedule allowed approximately 2 1/2 hours on each of the two days (including preparation time and breaks).

For the 2008 MSA-Math, the primary testing days were as follows:

- Test materials delivered to schools (Examiner's Manuals, Test/Answer Books, and Test Coordinator's Kit) — On or Before March 10, 2008
- Mathematics Primary Testing Window — April 1 – April 10, 2008
- Make-up Testing Window — April 11 – April 16, 2008

Students and parents should be reminded of the importance of students attending school during the administration of the MSA and the importance of student participation in MSA testing. Maryland was held to the 95% participation requirement under NCLB by the US Department of Education, and schools should do all they can to test all students on MSA or Alt-MSA (as applicable).

If a student was absent on the testing days, a make-up test was administered on any two consecutive days within the testing window. If a school had an unscheduled closing or delayed opening that prohibited the administration from occurring on the scheduled testing dates, the STCs were consulted by LACs to determine the testing schedule to be followed.

During the administration of the 2008 MSA-Math, MSDE had testing monitors in selected schools observing administration procedures and testing conditions. All monitors had identification cards for security purposes. There was no prior notification of which schools would be monitored, but monitors followed local procedures for reporting to the school's main office and giving proper notification that an MSDE monitor was in the building.

Student Participation

All students in grades 3 through 8 had to participate in the 2008 MSA-Math. The only exception was that students with severe cognitive disabilities were assessed by the *Alternate Maryland School Assessment* (ALT-MSA) instead of the regular MSA-Math. The criteria that students should need to be tested in the Alt-MSA program instead of the MSA-Math can be viewed in section 2, Appendix C of the TACM.

On May 9, 2007, the U.S. Department of Education issued guidance for the development of Alternative Assessment based on Modified Academic Achievement Standards (also known as AA-MAAS or "Modified Assessments"). Maryland was in the process of developing the Modified Maryland School Assessment (Mod-MSA), but the assessment was not completed in time for the 2008 administration window. Students, however, might have been identified through the Individualized Education Program (IEP) process in the current school year as takers of the Mod-MSA. For 2008, these students were assessed using the regular MSA-Math.

Accommodations for Assessment

Accommodations for assessment of students with disabilities (i.e., students having an Individualized Education Program or a Section 504 Plan) and students for English Language Learners (ELL) had to be approved and documented according to the procedures and requirements outlined in the document entitled "Maryland Accommodations Manual: A Guide to Selecting, Administrating, and Evaluating the Use of Accommodations for Instruction and Assessment" (MAM). A copy of the most recent edition of this document is available electronically on the LAC and STC web pages at https://docushare.msde.state.md.us/docushare.

No accommodations could be made for students merely because they were members of an instructional group. Any accommodation had to be based on individual needs and not on a category of disability area, level of instruction, environment, or other group characteristics. Responsibility for confirming the need and appropriateness of an accommodation rested with the LAC and school-based staff involved with each student's instructional program. A master list of all students and their accommodations had to be maintained by the principal and submitted to the LAC, who provided a copy to MSDE upon request. Please refer to Section 1 of the 2008 TACM for further information regarding testing accommodations.

Large-Print and Braille Test Books and Kurzweil™ Test Forms on CD

The MSA-Math was administered to those requiring (1) large-print Student Test/Answer Books or (2) Braille Test Books, or (3) Kurzweil™ Test Forms on CD for a verbatim reading accommodation. For large-print Test/Answer Books, Braille Test Books, and Kurzweil™ Test Forms on CD, student responses were transcribed into the standard-size Test/Answer Book following testing.

The student's name, LEA number, and school number were written on the large-print Test/Answer Book for proper transcription into the the standard-size Test/Answer Book.

The pre-printed student ID label was affixed to the standard-size Test/Answer Book containing the transcribed responses, and not to the large-print Test/Answer Book or Braille books. The bubbles on the demographic page of the standard-size Test/Answer Book were not filled in if there was a pre-printed student ID label for the student.

A certified Test Examiner (TE) transcribed the student responses into a standard-size Test/Answer Book exactly as given by the student. The standard-size Test/Answer Book with the pre-printed or general label attached was returned to Pearson with all other Test/Answer Books.

Large-Print Test/Answer Books and Braille Test/Answer Books containing the original student responses prior to transcription are to be returned with Non-Scorable materials. Any Test/Answer Books which were used as source documents for transcription were invalidated by drawing a large slash across the student demographic page with a black permanent marker.

Once the student responses had been transcribed, the transcribed Test/Answer Book was returned for scoring with the standard-size materials. Specific packing instructions are provided in the 2008 TACM in section 4.

Verbatim Reading Accommodation and Kurzweil™ Test Form on CD

Students who had a verbatim reading accommodation documented in their Individual Education Plan (IEP), ELL Plan, or Section 504 Plan, and who received that accommodation in regular instruction, received the accommodation on the 2008 MSA-Math. The accommodation was provided by a live reader or through technology. Section 1 of the 2008 TACM provided information on verbatim reading instruction. Technology used to provide the verbatim reading accommodation was Kurzweil™ reading software. Official, secure electronic copies of the test were ordered through the LAC. MSDE encouraged (but did not require) the use of the Kurzweil™ software to ensure uniformity in the delivery of the verbatim reading accommodation throughout the state.

Students using Kurzweil™ software had to familiarize themselves with its operation prior to the test administration. When there were technical difficulties with Kurzweil™ a certified staff member was used instead. Kurzweil™ Test Form CDs were shipped by Pearson. After testing, schools returned the CDs to Pearson with the non-scorable secure materials.

Administration Procedures for Students with IEP, 504 Plan, or ELL Plan Permitting a Dictated Responses or Use of Word Processor

A student whose IEP, 504 Plan, or ELL Plan permitted a dictated response had his/her responses transcribed at the school level by an eligible TE, or by a staff member working under the direct supervision of a certified TE, into the student's Test/Answer Book with a pre-printed or generic ID label attached.

A student whose IEP, 504 Plan, or ELL plan permitted the use of a word processor had his/her responses transcribed by hand or under the direct supervision of an eligible TE or STC exactly as the student entered his/her responses on the word processor. The student's responses were always transcribed at the school level into the student's Test/Answer Book with the pre-printed or generic ID label attached. After the student's responses had been transcribed, the memory of the word processor was cleared. The original word-processed print-out was returned to Pearson with the non-scorable materials.

Test Format

All grade levels of the MSA-Math used a Test Book format in which students wrote their answers directly in the Test Book. There were 10 forms of MSA-Math. Different test forms were administered to students in each classroom participating in math tests, and each test form was identified by color and form number/letter. All forms of the MSA Test/Answer Books for each grade had the same grade designation and picture on the front cover. The Test/Answer Books were spiraled within a classroom, and each student used a combined Test/Answer Book.

Since the Test/Answer Books were scanned for scoring, students were encouraged not to use highlights in any part of the book. Although students might be accustomed to using highlighters in daily instruction, highlighting in the Test/Answer Book could obliterate information in a student's book when it was scanned for scoring. As an alternative to highlighting, students were allowed to lightly circle or underline information in test items or perform calculations to help them in responding, as long as markings did not interfere with the bubbled answer choice area and/or the track marks along the outside margins of each page.

Security of Test Materials

The following code of ethics conforms to the Standards for Educational and Psychological Testing developed by the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education (Harcourt, 2008):

> It is breach of professional ethics for school personnel to provide verbal or nonverbal clues or answers, teach items on the test, share writing prompts, coach, hint, or in any way influence a student's performance during the testing situation. A breach of ethics may result in invalidation of test results and local education agency or MSDE disciplinary action. (p. 13)

The Test/Answer Books for the 2008 MSA-Math were confidential and kept secure at all times. Unauthorized use, duplication, or reproduction of any or all portions of the assessment was prohibited, which is reflected by the following statement (Harcourt, 2008):

> Violation of security can result in prosecution and/or penalties as imposed by the Maryland State Board of Education and/or State Superintendent of Schools in accordance with the COMAR 13A.03.04 and 13A.12.05. (p. 13)

All materials were treated as confidential and placed in locked areas. Secure and non-secure test materials were as follows:

- Secure materials: Test/Answer Books (including large-print and Braille), Kurzweil™ test forms on CD, and used scratch paper
- Non-secure materials: TACM, Examiner's Manuals, unused pre-printed student and generic ID labels, unused FedEx return shipping labels, and unused green/orange shipping labels

1.6 Scoring Procedures of the 2008 MSA-Math

Students' responses to *SR* and *SPR* items were machine-scored, and their responses to *BCR* and *ECR* items were individually read and scored by Pearson.

Once received by Pearson, Test/Answer Books were scanned into an electronic imaging system so that the information necessary to score responses was captured and converted into an electronic format. Students' identification and demographic information, school information, and answers to *SR* items were converted to alphanumeric format; hand-written responses were captured in digital image format.

Machine-Scored Items

After students' responses to *SR* and *SPR* items were converted to text format, the scoring key was applied to the captured item responses. Correct answers were assigned a score of one point. Incorrect answers, blank responses (omits), and responses with multiple marks were also assigned a score of zero.

Hand-Scored Items

Test/Answer Books were scanned into the electronic imaging system, allowing scorers to score these responses online at all scoring sites while maintaining the live documents at the contractor's facility. The imaging system randomly distributed responses, ensuring no one scorer scored a disproportionate number of responses from any one school. This online scoring system maintained a database of actual student responses and the scores associated with those responses. An off-site backup of all images and scores was maintained as well to guard against potential loss of data and images due to system failure. The system also provided continuous, up-to-date monitoring of all scoring activities. Detailed information on MSA scoring specification can be obtained in the document *Performance Assessment Scoring Center: Spring 2008 Scoring Specification for MSA-Reading and Math*, which is available from either MSDE or Pearson.

Scoring Staff

The MSDE had one Room Director (RD) dedicated to each grade level, domain (Math), and site. The RD worked closely with the PASC Training Supervisor and the PASC Math Specialists. The PASC Training Supervisor, Math Specialist, and RDs participated in the anchor-pulling sessions in Maryland. (Detailed information about anchor-pulling procedures can be found in the following portion of this section: *Development Procedures for Anchor Pulling*.) The Room Director/Training Team Leader was responsible for maintaining annotations and meeting minutes from all sessions. These notes were a record of the comments and decisions made by the MSDE personnel and members of the Maryland teacher committee. These notes were utilized by the RD responsible for training the Team Leaders (TLs) and Readers for the respective Maryland prompts. For MSDE scoring projects, PASC had qualified alternate RDs available at the beginning of the project to ensure a timely start of training in the event that the primary RD was unavailable to start as scheduled. The alternate RD acted as a TL unless the RD couldn't fulfill his/her duties.

1) Reader/Scorer

A graduate of a four-year accredited college or university who had successfully passed the PASC new reader exam and new reader training. The Readers were eligible to score custom programs for which they had been trained and successfully qualified.

2) Team Leader (TL)

An experienced reader who directly monitored the scoring of a team of Readers and retrained as needed. The reader had successfully completed the PASC TL training program.

3) Room Director (RD)

A knowledgeable team leader who had been selected to work with team leaders and the training supervisor to oversee the scoring of several teams. An RD's main duty was to rule on validity of questionable papers and to maintain consistency in scoring decisions. RDs also served as trainers.

4) Reader's Aide (RA)

PASC storeroom personnel whose main responsibilities during scoring were to do copying and printing for the PASC materials center. During anchor pulling, RA responsibility might include duplicating student papers. They might also be assigned a variety of clerical duties.

5) Developers

An experienced PASC reader that was responsible for selecting a wide variety of student responses for such activities as benchmarking, anchor pulling, range finding, and training materials. Selected papers were then submitted to MSDE for comment and approval. Developers remained on the project as anchor-pulling participants and trainers whenever possible.

6) Trainers

Experienced personnel who were TLs or RDs and selected by the Training Supervisor to train and qualify readers for Maryland. Additionally these experienced personnel might also train new Readers and do domain-specific training.

Reader Recruitment and Qualifications

All Readers for MSDE had to provide Pearson's staffing vendor their résumé and documentation of a four-year college degree. As part of the initial screening process for recruiting Readers into Pearson's general pool, applicants had to respond to an open-ended prompt. This writing sample ensured that all applicants were able to perform the kinds of tasks they would assess. The writing sample was intended to screen out those who couldn't write standard, idiomatically correct English or who couldn't organize their thoughts clearly. The writing prompt was scored by a qualified PASC staff member. If successful on the preliminary screening, applicants then participated in a one-day general introductory training workshop presented by a PASC staff member. These workshops allowed Pearson to eliminate potential Readers who might seem qualified according to their educational and professional experience but who couldn't learn to score to a scale consistently or who were otherwise unsuitable for assignment to large-scale scoring projects. The PASC staff member who presented the workshop evaluated each potential Reader and submitted these evaluations to the Training Supervisor/Site Supervisor with his/her recommendations. Those who successfully completed the workshop were added to Pearson's general pool of Readers who were potential scorers of Math assessments. This addition to the general pool did not necessarily qualify these Readers for scoring the MSDE program.

Team Leader Selection and Qualification

The training for new TLs consisted of a two-day course focusing on the duties and responsibilities necessary to successfully manage a team of Readers. The workshop was led by two PASC Training Supervisors. The instruction included a review of PASC policies and procedures, sessions on use of the Reader monitoring reports to track a Reader's speed and accuracy, practice annotating anchors and simulated training of the annotated papers, role playing activities which explored various situations that could occur with Readers during the scoring of a project, and Reader counseling and retraining guidelines. Hands-on training on the various TL computer applications was also provided in the workshop. Upon completion of the workshop, the two PASC Training Supervisors reviewed each participant's performance, making sure that each had a complete understanding of the TL role and its responsibilities. Any participant they found who did not perform to their satisfaction was not added to the qualified TL list.

Team Leader Project Training

Project-specific TL training for MSDE was conducted in the days immediately preceding scoring and Reader training. This training began with the RD reading the rubrics aloud and answering any questions the TL or assistant RD might have regarding the rubric. The RD then read each anchor paper aloud to the TLs. Each response in the anchor set was thoroughly explained, including the notes and comments of the anchor-pulling committee. Training set A was reviewed next. The TLs scored the training set individually, recorded the scores on the answer sheet, and then waited for all TLs to complete the scoring. When everyone had completed scoring the training set, the RD discussed the answers one by one, focusing on why it was that score and not another. The RD reviewed with the group the reason for assigning each score point and discussed each paper in its entirety. The TLs were then ready to score Training set B. Training set B was scored and reviewed exactly as Training set A.

Having thoroughly discussed both training sets with the group, the RD explained that in order for a participant to qualify as a TL, it was required that the TL should score at least an 80% perfect match on both of the qualifying sets (Qualification Rules, Attachment M). The TLs scored the first qualifying set individually and recorded their scores on the appropriate answer sheet. As each TL finished scoring, he/she brought the answer sheet to the RD for grading. Each answer was reviewed and any questions the TL had were addressed before the TL attempted the next qualifying set. The TL followed the same procedure with Qualifying set 2. Upon completing the second qualifying set, the TL submitted the answer sheet to the RD for grading. TLs had to pass both sets for Math Step B and 90% in Math Step A as specified in the qualification rules or they would be released from the MSDE project.

After the qualification process, the RD continued the training process with the decision set. This set was read aloud and each paper thoroughly explained and discussed. By following these procedures, the RD ensured that the anchor-pulling committees' notes and comments were completely understood.

Team Leader Duties

TLs were responsible for monitoring the training and qualifying of the Readers assigned to their team. The TLs assisted the RD, if requested, during the training of the Readers. The TL was responsible for grading the Readers' qualifying sets and discussing the results with the Readers so everyone received the same direction. The TL certified to the RD and Training Supervisor that the Reader was qualified and recorded the scores under Qualification scores on the Reader evaluation

form. The TL was also responsible for monitoring each Reader's assignment of scores to the responses. Additionally, the TL reviewed the daily Reader statistical reports with each individual on the team. The TL consulted the RD regarding variations by the team members from the acceptable standards (95% for Math Step A, and 85% for Math Step B). The TL had the initial responsibility to see that the Reader maintained the set standards through individual retraining. The RD monitored the TL by reviewing team statistics and working one-on-one with the TL.

Room Director Selection and Qualification

The candidates for RD had been recommended by the PASC Managers or Training Supervisors. The recommendations were based upon the evaluations the candidates received as Readers and TLs and were part of their personnel file. The Training Supervisors met as a group to discuss who might be considered for the position of RD. The Training Supervisor group reviewed the evaluations and the duties that the potential RDs had performed. The candidates generally had been TLs on large-scale projects for multiple teams, and/or they had served as TLs on small-scale projects where TLs trained their individual teams. They had been evaluated on their ability to train Readers as well as their ability to monitor the scoring accuracy and consistency of Readers. These evaluations were submitted in writing at the end of each scoring project by the Readers and RDs that had observed the work of the RD candidates.

Room Director Project Training

The RDs familiarized themselves with the rubric. Any questions regarding the rubric were addressed by the PASC Math Specialists or MSDE. The next step was for the RD/TTL to prepare the anchors by annotating each response to all score points in the Anchor Set utilizing the notes from the anchor-pulling session. The MSDE approved the anchor-pulling notes and the Training Supervisor confirmed that the RD had accurately added the anchor-pulling notes to the training materials. The RD continued the process by annotating the training sets and decision sets with all notes and comments from the anchor-pulling session. Additionally, the RDs became familiar with the wording of all of the other prompts for the administration to which they were assigned.

Room Director Duties

The RD's job was to conduct the training of the TLs and Readers, oversee the actual scoring of the papers, monitor the work of the TL, and act as the decision maker for situations or questions that may arise during the scoring process. For example, all invalid (foreign language, off-topic, off-mode, etc.) responses were reviewed by the RD, who had to confirm any such decision and ensure consistency of decisions. (Blanks were confirmed at the TL level and did not require RD confirmation.) Additionally the RD and TL (after approval of Training Supervisor) conducted all resolution readings. Responses for which scores were non-matching or non-adjacent were automatically routed to the RD for an independent resolution scoring. The resolution score became the reported score.

The RD was familiar with all prompts and trained the TLs and Readers to recognize these alternate prompts. Thus, should the student have written his/her answer in the wrong place, the answer was recognized by the RD, who could electronically move the response to the appropriate space for scoring by a Reader qualified on the appropriate prompt. The RD also reviewed any potential questionable content responses and forwarded those to the Training Supervisor to consult with the MSDE before processing.

The RD was also responsible for daily statistical review and analysis of all monitoring reports to ensure the quality of the scoring within the room. Review of the data allowed the RD not only to

monitor the Reader but also to provide the TL with additional input. Available data included 1) individual Reader agreement rates between two independent scorings; 2) score point distributions by Reader and trend review; 3) prompt statistics for agreement rates and score point distributions; 4) Resolution data.

Project Scoring Parameters

MSDE had a long-standing history of implementing assessments that were composed of multiple item types: selected response (SR), brief constructed response (BCR), extended constructed response (ECR), and gridded or student-produced response (SPR). The MSA-Math contained all such item types for operational scoring, and each of the 10 forms per grade also contained field test items of each of these types. Open-ended items were scored using a generic rubric as follows:

- Mathematics BCR items: Step A 0-1 scale, Step B 0-2 scale
- ECR items Step A 0-1 scale, Step B 0-3 scale

All MSA-Math response documents were image-scanned at Pearson's scoring center in San Antonio, Texas. The image scanner captured document identification (ID), demographic information, SR responses, and created a bi-tonal image of the entire document, allowing images of the BCR and ECR responses to be distributed to Readers for human scoring while images of the SR, SPR and all other data were made available to Scoring Editing for human review.

All constructed responses were scored by Pearson's Performance Assessment Scoring Center (PASC). The PASC mission was to provide accurate, reliable, on-time scores for all student responses entrusted to our care. PASC maintained large pools of qualified, trained, professional Readers who were well-experienced in scoring a wide range of writing assessments and open-ended assessments in reading, mathematics, science, social science, and other subjects, at each of our scoring sites.

Reader Project Training

Reader training was lead by the RD/TL and was conducted utilizing our central scoring model. There was one RD responsible for each site, grade, and Domain (Math). After all student responses were scored for the first item, the RD reconvened the group and trained the second item. Training began with the definition and an overview of holistic scoring. Training continued with a reading and discussion of the generic rubric and then the student responses in the anchor set were read and discussed. In the anchor set the scores had been recorded on the student responses and were arranged in ascending point-scale order. Each annotated anchor response was read aloud and discussed thoroughly. Emphasis was placed on the Readers' understanding of how the responses differed from one another in incremental quality, how each response reflected the description of its score point as generalized in the scoring rubric, and how each reflected the MSDE's standard for application of each score point.

Once Readers had all their questions answered and the discussion of the anchor set was finished, the Readers began to score the first training set. Each Reader independently read and scored the responses in the training set. The trainer scored and recorded each reader's responses on a training record form. The correct scores were then read to the group when everyone had completed the scoring. In addition, each training paper was discussed as to reasons for applying each given score. At this point, Readers interacted with the RD in discussing the characteristics of each response that earned the assigned score point. The same format was followed for each training set. During this process, the job of the Reader was to internalize the scoring scale and adjust his or her

individual scoring to conform to that scale. Once all training papers had been scored and fully discussed, Readers began the qualifying process.

For MSDE, there were three qualifying sets. MSDE informed PASC in writing for each specific administration how many qualifying sets were approved and were available to the Readers. Readers had to score at least an 80% on at least one of two qualifying sets for Math.

Inter-Rater Agreement

Pearson's scoring system generated many kinds of internal monitoring reports that enabled the project leadership to monitor the accuracy and consistency of MSDE scoring. These reports were compiled by prompt, listed the entire prompt's Readers, and provided the results of their scoring for each day. Information on these reports included the number of responses read by the Readers during the period, the number and percent of invalid responses, and the number of responses for which there had been a second reading. The number of responses with second readings provided data that allowed for reporting of the number and percent of responses with perfect agreement; the number and percent of responses on which the first Reader was a point lower than the second Reader; the number and percent of responses on which the first Reader was a point higher than the second Reader (Adjacent); and the number and percent of responses differing by more than one score point (Non-Adjacent/Non-Perfect). The Training Supervisor also reviewed the daily statistical reports to identify individuals or teams who might need retraining in order to provide continuous scoring consistency on the project. MSDE received data summary reports. Statistical summaries of inter-rater reliability can be found in section 3.4, *Inter-Rater Reliability*.

Reader Retraining

When a Reader's performance fell below acceptable parameters for a project, the Reader was retrained. Retraining was the process by which the RD or TL utilized a number of methods such as individual tutoring on problem score points, individual review of selected responses, and anchor and rubric review to get a Reader back on track with the guidelines provided by a specific program. Group retraining was conducted by the RD every Monday (or following any extended break) during the scoring project. In addition, daily retraining occurred as deemed necessary by the MSDE representative and Training Supervisor.

Read Behinds

Pearson's system allowed TLs and/or RDs to conduct read behinds as an additional monitoring method. When conducting read behinds, the TL or RD received images of student responses and the scores assigned by the Reader. Responses selected for read behinds might be randomly selected or might be targeted read behinds (e.g., responses receiving specific scores, etc.). These read behinds were very useful in tracking specific areas of confusion for a given Reader or group of Readers and assisted the TL and RD in knowing just how to direct retraining activities for individual Readers or teams. The initial read behind percentage was set at 50%. This percentage might be adjusted either higher or lower by the TL based upon the performance of the Reader.

Retraining Readers with < 80% Agreement rates

It was the responsibility of the Team Leader (TL) to not only address questions and provide guidance to the Readers, but to also monitor and manage performance; this included Calibrations, Read Behinds, Agreement rates, and Resolution rates. At times, TLs could become easily side-tracked and spend more time acting as a resource for Readers than managing performance. PASC had identified this issue and planned to allocate additional TLs whose primary job responsibility

was to manage/monitor performance. This level of staffing allowed us to monitor each Reader daily and provide retraining when the level of acceptable performance had not been met.

Pre-"Live" training on Field Test prompts

For 2008, PASC used scored student responses from the appropriate field test administration. This allowed the Readers to build familiarity with the program prior to live scoring.

Trainers Earlier and Longer

In addition to increasing the number of TLs dedicated to the program, PASC also felt it more effective to expedite and extend the time the Trainers were onsite. PASC trained a qualified individual at each site to act as the remote Trainer once the primary left. This individual was responsible for retraining Readers as needed.

Scoring Rules for MSA-Math

The following scoring rules were applied to MSA-Math BCR and ECR items:

- Math BCR (Brief Constructed Response) items were scored:
  Step A: 0, 1 with two readings
  Step B: 0, 1, 2 with two readings
- Math ECR (Extended Constructed Response) items were scored:
  Step A: 0, 1 with two readings
  Step B: 0,1,2,3 with two readings
- Scores given were the higher of the 1st and 2nd Reader's scores provided they were adjacent.
- For example:

1st Reader	2nd Reader	Final Score
1	2	2
2	3	3

- A resolution reader was used if two non-adjacent initial scores were received.
- The resolution reader's score was used in place of both the 1st and 2nd Readers' scores.
- For example:

1st Reader	2nd Reader	Resolution Reader	Final Score
0	2	1	1
0	3	2	2
1	3	3	3
2	0	1	1
3	0	2	2

Development Procedures for Anchor Pulling

A Developer is a PASC Reader who was selected by the PASC Training Supervisor to prepare sets of papers for client approval. These experienced Readers were judged by the Training Supervisor for their ability to recognize and assemble a wide variety of responses. A Material Development Evaluation was completed by the Math Specialists for review by the Training Supervisor. This evaluation was part of the Developer's personnel file. The Developer also participated with the clients as a facilitator during the anchor-pulling session in order to make notes and be prepared to assemble the finished sets to the client's specifications. In the case of the MSDE, the Developer was also the RD. For a given math prompt, the PASC Developers had the following responsibilities:

1) To know the prompt and the rubric thoroughly

2) To read responses

- Looked for responses that seemed to represent the full range of quality as described in the rubric.
- Searched all orders for responses, with particular emphasis on the state's high-performing districts.
- Included not only papers that were homogeneous in their level of quality but also papers that differed in quality from variable to variable but which could be given an overall classification of High, Medium, or Low.
- Marked High, Medium, and Low papers—marked especially good ones that might potentially receive top scores.
- Identified and flagged problem papers—off-topic, off-task, verbatim copying, strange, potential teacher interference, etc.
- Marked the flag with score range or the nature of the problem and paper ID.

3) To sort copies

- Copies were sorted into piles, reflecting the nature of the flag—all potential high papers were together, all potential medium papers were together, etc., with all problem papers grouped together.
- For problem or decision papers, duplicates of types of problems were culled. The best example of each problem type was retained; the rest were set aside for possible future use.

4) To develop sets for anchor pulling

- Decided which particular papers from the sorted piles should go into which set for anchor pulling. Each paper selected went into only one set.
- Used the following guidelines in deciding for which set a paper was most appropriate.

  A. ***Anchor set***: At least three examples of each score point, depending upon the score scale (no invalids). These had to be clean papers but needed to illustrate different types of the same score point, if there were such clear differences. Once completed, this set was submitted to the Training Supervisor and to MSDE for review and approval.

B. ***Decision set***: This had to be a set of whatever size necessary to illustrate the various kinds of problems that might arise with this prompt or item. If the number of such responses was small, these might be incorporated into the first training set instead of being grouped into a separate additional set.

C. ***Training sets***: These were at least two sets of up to 20 papers each (again, this varied according to the score point scale). They had to contain a range of responses including clean papers, line papers, and problem papers. The responses had to be in random order of quality and unmarked.

D. ***Qualifying sets***: There were three sets of these. Generally there were 10 responses per set, but there could have been fewer, depending upon the score scale. These had to consist heavily of clean papers but not exclusively so. One of the sets might include an example of an invalid response, but it had to be clearly so.

E. ***Calibration sets (validity sets)***: These were composed of five responses of mixed quality, arranged in random order. Pearson created as many different sets as there were expected to be scoring days on a single prompt or group of items—minus one or two for the training day and the initial scoring day.

Comprehensive notes concerning the specific problems presented in these papers (and the solutions as decided by the committee during the anchor-pulling session) were to be recorded by the Pearson representatives (Developers and Training Specialists) and were to be discussed with the Readers during training. Any subsequent notes or communication from MSDE were incorporated into the training material as well.

Anchor Pulling Procedures

The objective of anchor-pulling sessions was for the team members to arrive at a consensus as to the score of each paper in the proposed training materials. These sessions were attended by Maryland educators, MSDE, and PASC Math Specialists, Managers, Training Supervisors, and the Developers, who selected and prepared all of the papers that would be reviewed. These papers and their corresponding scores formed the basis of selecting final Anchor Sets, Decision Sets, Training Sets, and Qualifying Sets. Discussions among the team members were important, as they revealed what kinds of qualities characterized certain score points. The most difficult aspects involved balancing widely discrepant qualities found in the same paper and defining the line between adjacent scores.

During formal anchor pulling, the procedure for assigning scores to the papers in each set was as follows:

- Papers were read aloud and discussed by the anchor-pulling panel. Reading aloud focused attention on the ideas presented—or what the student had to say—allowing the panel members to divorce themselves from how the paper looked or how well it had been edited.
- After each response was read, each panel member independently assigned a score. An overall tentative score was assigned to each response on which there seemed to

be consensus. However, all assigned scores at this point, even those on responses for which there were complete agreement, were provisional and subject to change based on later considerations.

- Each subsequent set was read and scored by each panel member, using the tentative scores on the previous sets as guidelines. After each set had been read, the results were recorded on a consensus sheet and discussed.

The responses in which score points were not in perfect agreement were discussed, starting with the lowest, but least controversial, score point. The papers that had the widest discrepancies of assigned scores around this lowest score point were discussed next before moving on to the papers whose assigned scores were in the next higher range. There might be frequent reference to previous sets to make sure that decisions on score points were consistent.

This iterative process of reading, charting, and discussing successive sets had three results:

- It established scores for papers for which there was virtually unanimous agreement.
- It identified papers that were on the line between two adjacent scores, necessitating the clarification of that line.
- It contributed to understanding the rationale behind scoring decisions.

During this process, the tentative scores assigned to papers in earlier sets became firm.

1.7 The 2008 MSA-Math Operational Item Analyses

Classical Analysis with Form-to-Form Common Items

As mentioned in chapter1.4, two operational forms were linked using common items appearing on both forms (i.e., operational forms A and F) and randomly distributed to students. As a result, classical analysis of these common items was conducted to check if the two groups taking different operational forms were equivalent. The following descriptive statistics were calculated based on a raw, number-right score of the common items: mean (*M*) and standard deviation (*SD*). The results indicated that the students taking the two operational forms were statistically close and equivalent across all grades, as seen from Table 1.24.

Table 1.24 Descriptive Statistics of Form-to-Form Common Items

Grade	Form	No. of Items	*N*	*M*	*SD*
3	A	44	29,364	33.93	8.28
	F	44	29,253	34.46	8.05
4	A	36	30,101	26.77	7.76
	F	36	29,933	27.05	7.55
5	A	51	30,537	37.29	11.88
	F	51	30,289	37.83	11.65
6	A	44	31,060	29.97	10.56
	F	44	30,292	30.79	10.23
7	A	30	31,804	18.56	7.22
	F	30	31,048	18.73	7.06
8	A	35	32,318	21.94	9.60
	F	35	31,743	22.38	9.46

Note. Form A designates the identical operational portion of Forms A, B, C, D, and E. Form F designates the identical operational portion of Forms F, G, H, J, and K.
Note. Analysis was conducted with a statewide population.

P-Value Check with Year-to-Year Core Linking Items

As mentioned in chapter 1.4, different year's assessment was linked using core linking items. This section was prepared to provide information about how much p-values (i.e., classical item difficulty) of the 2008 core linking items varied from previous years.

First of all, it should be noted that detailed information about Rasch analysis on these core linking items can be found in chapter 1.10, *Calibration, Equating, Scaling*. Second, only SR items were used for the purpose of year-to-year linking. Third, classical analysis (e.g., p-value) on these items was conducted with a statewide population, and item sequence number on the tables was assigned based on the 2008 assessment. As seen from Tables 1.25 through 1.36, we could concluded that most of the 2008 p-values were almost the same or slightly increased compared to those of previous years across all grades.

Table 1.25 P-Value Comparisons of Core Linking Items for Previous Year vs. Year 2008: Grade 3 Form A

Item Seq. No.	Item CID	Previous Year	2008	Item Seq. No.	Item CID	Previous Year	2008
1	3509931	0.65	0.69	48	3510065	0.96	0.94
2	3548059	0.71	0.75	49	3510063	0.78	0.78
5	3510009	0.79	0.84	50	100000044158	0.77	0.86
6	3509974	0.66	0.65	51	3510018	0.77	0.78
7	3548057	0.73	0.80	52	3510035	0.87	0.88
8	3509955	0.57	0.61	55	3510055	0.62	0.62
14	3509959	0.70	0.70	56	3510027	0.87	0.87
16	3509960	0.76	0.78	62	3510347	0.68	0.74
17	3509964	0.74	0.79	63	3510053	0.84	0.84
21	3510068	0.81	0.84	64	3510058	0.86	0.88
22	3510022	0.47	0.51	65	3510051	0.54	0.57
23	3509927	0.78	0.80	66	3509929	0.54	0.53
24	3510006	0.61	0.59	67	3510329	0.55	0.55
32	3509935	0.67	0.61	68	3510033	0.79	0.82
33	3510066	0.80	0.80	69	3510043	0.76	0.77
41	3510125	0.52	0.56	70	3510012	0.78	0.80
44	100000044163	0.85	0.76	72	3509962	0.88	0.90
45	3509926	0.36	0.39	82	3510036	0.85	0.85
47	3509961	0.92	0.91				

Note. Analysis was conducted with a statewide population.
Note. Item sequence numbers were assigned based on the 2008 assessment.
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Descriptive Statistics of Year-to-Year Core Linking Items: Grade 3 Form A

Form	Year	No. of Items	*M*	*SD*
A	Previous Year	37	0.73	0.14
	Year 2008	37	0.74	0.13

Table 1.26 P-Value Comparisons of Core Linking Items for Previous Year vs. Year 2008: Grade 3 Form F

Item Seq. No.	Item CID	Previous FA	Y08 FA	Item Seq. No.	Item CID	Previous FA	Y08 FA
1	3509931	0.65	0.70	48	3510065	0.96	0.94
2	3548059	0.71	0.76	49	3510063	0.78	0.78
5	3510009	0.79	0.84	50	100000044158	0.77	0.85
6	3509974	0.66	0.66	51	3510018	0.77	0.79
7	3548057	0.73	0.81	52	3510035	0.87	0.89
8	3509955	0.57	0.63	55	3510055	0.62	0.62
14	3509959	0.70	0.72	56	3510027	0.87	0.87
16	3509960	0.76	0.81	62	3510347	0.68	0.76
17	3509964	0.74	0.82	63	3510053	0.84	0.85
18	3509956	0.64	0.65	64	3510058	0.86	0.88
21	3510068	0.81	0.87	65	3510051	0.54	0.58
22	3510022	0.47	0.52	66	3509929	0.54	0.55
23	3509927	0.78	0.80	67	3510329	0.55	0.56
24	3510006	0.61	0.59	68	3510033	0.79	0.84
29	3510126	0.78	0.76	69	3510043	0.76	0.79
31	100000044154	0.81	0.87	70	3510012	0.78	0.80
32	3509935	0.67	0.63	72	3509962	0.88	0.91
33	3510066	0.80	0.81	76	3510020	0.82	0.84
45	3509926	0.36	0.47	82	3510036	0.85	0.85
47	3509961	0.92	0.92				

Note. Analysis was conducted with a statewide population.
Note. Item sequence numbers were assigned based on the 2008 assessment.

Descriptive Statistics of Year-to-Year Core Linking Items: Grade 3 Form F

Form	Year	No. of Items	*M*	*SD*
F	Previous Year	39	0.73	0.13
	Year 2008	39	0.76	0.12

Table 1.27 P-Value Comparisons of Core Linking Items for Previous Year vs. Year 2008: Grade 4 Form A

Item Seq. No.	Item CID	Previous FA	Y08 FA	Item Seq. No.	Item CID	Previous FA	Y08 FA
1	3515406	0.60	0.64	49	3515471	0.86	0.86
2	3515407	0.85	0.86	50	3515630	0.50	0.52
3	100000044146	0.89	0.91	53	3515787	0.51	0.54
6	3515408	0.68	0.76	54	3515533	0.85	0.84
7	3515641	0.83	0.79	55	3515631	0.77	0.78
8	3515410	0.81	0.87	56	3515486	0.57	0.59
10	3515605	0.53	0.61	57	3515484	0.92	0.91
19	3515447	0.45	0.52	63	3515543	0.79	0.80
22	3515604	0.64	0.69	64	3515853	0.71	0.80
24	3515576	0.61	0.65	66	3548078	0.50	0.49
25	3515470	0.69	0.73	67	3515933	0.76	0.76
26	3515643	0.38	0.42	68	3515519	0.82	0.86
27	3515645	0.71	0.72	69	3515795	0.60	0.65
30	3515559	0.72	0.69	70	3515545	0.86	0.87
31	3515426	0.44	0.48	71	3548086	0.76	0.81
32	3515571	0.85	0.80	78	3515506	0.89	0.90
34	3515421	0.82	0.85	79	3515887	0.89	0.86
35	3515574	0.85	0.86	80	3515632	0.71	0.69
47	3515575	0.77	0.88	81	3548088	0.74	0.75
48	3515705	0.75	0.81				

Note. Analysis was conducted with a statewide population.
Note. Item sequence numbers were assigned based on the 2008 assessment.

Descriptive Statistics of Year-to-Year Core Linking Items: Grade 4 Form A

Form	Year	*N*	*M*	*SD*
A	Previous Year	39	0.71	0.15
	Year 2008	39	0.74	0.14

Table 1.28 P-Value Comparisons of Core Linking Items for Previous Year vs. Year 2008: Grade 4 Form F

Item Seq. No.	Item CID	Previous FF	Y08 FF	Item Seq. No.	Item CID	Previous FF	Y08 FF
1	3515406	0.60	0.65	50	3515630	0.50	0.54
2	3515407	0.85	0.86	55	3515631	0.77	0.79
6	3515408	0.68	0.77	56	3515486	0.57	0.58
7	3515641	0.83	0.81	57	1000000441	0.53	0.75
8	3515410	0.81	0.87	64	3515853	0.71	0.79
10	3515605	0.53	0.62	65	3515836	0.58	0.58
19	3515447	0.45	0.53	66	3548078	0.50	0.51
22	3515604	0.64	0.68	67	3515933	0.76	0.77
24	3515576	0.61	0.65	68	3515635	0.60	0.54
25	3515470	0.69	0.73	69	3515795	0.60	0.63
26	3515643	0.38	0.44	70	3515545	0.86	0.88
27	3515645	0.71	0.74	71	3548086	0.76	0.80
32	3515571	0.85	0.81	77	3548079	0.94	0.95
33	100000044145	0.86	0.95	78	3515506	0.89	0.92
34	3515421	0.82	0.85	79	3515887	0.89	0.90
47	3515575	0.77	0.87	80	3515632	0.71	0.71
49	3515471	0.86	0.86	81	3548088	0.74	0.76

Note. Analysis was conducted with a statewide population.
Note. Item sequence numbers were assigned based on the 2008 assessment.

Descriptive Statistics of Year-to-Year Core Linking Items: Grade 4 Form F

Form	Year	*N*	*M*	*SD*
F	Previous Year	34	0.70	0.14
	Year 2008	34	0.74	0.14

Table 1.29 P-Value Comparisons of Core Linking Items for Previous Year vs. Year 2008: Grade 5 Form A

Item Seq. No.	Item CID	Previous FA	Y08 FA	Item Seq. No.	Item CID	Previous FA	Y08 FA
1	3511312	0.39	0.42	40	3511479	0.51	0.61
2	3511269	0.81	0.88	41	3511504	0.90	0.88
8	3511203	0.87	0.91	43	3511513	0.85	0.85
10	3512535	0.46	0.55	47	3511266	0.71	0.70
16	3511196	0.55	0.58	49	3511470	0.81	0.86
17	3511307	0.41	0.42	50	3511499	0.63	0.63
19	3511467	0.85	0.82	51	3511330	0.63	0.61
20	3512529	0.56	0.58	55	3512595	0.79	0.80
21	3511339	0.62	0.66	56	3511521	0.67	0.62
23	100000043853	0.57	0.67	59	3511376	0.81	0.88
26	3511216	0.67	0.71	60	3511396	0.84	0.88
27	3512638	0.64	0.74	61	3511429	0.75	0.77
28	3512691	0.52	0.60	69	3512625	0.88	0.90
34	3512702	0.54	0.50	70	3511631	0.76	0.78
37	3511566	0.66	0.66	72	3511439	0.79	0.77
38	3511246	0.78	0.76	79	3511442	0.61	0.62
39	3511458	0.92	0.87	83	3511448	0.76	0.77

Note. Analysis was conducted with a statewide population.
Note. Item sequence numbers were assigned based on the 2008 assessment.

Descriptive Statistics of Year-to-Year Core Linking Items: Grade 5 Form A

Form	Year	*N*	*M*	*SD*
A	Previous Year	34	0.69	0.15
	Year 2008	34	0.71	0.14

Table 1.30 P-Value Comparisons of Core Linking Items for Previous Year vs. Year 2008: Grade 5 Form F

Item Seq. No.	Item CID	Previous FF	Y08 FF	Item Seq. No.	Item CID	Previous FF	Y08 FF
1	3511312	0.39	0.42	44	3512632	0.39	0.42
2	3511269	0.81	0.89	47	3511266	0.71	0.70
8	3511203	0.87	0.92	49	3511470	0.81	0.87
10	3512535	0.46	0.56	50	3511499	0.63	0.64
16	3511196	0.55	0.59	51	3511330	0.63	0.62
17	3511307	0.41	0.42	55	3512595	0.79	0.80
19	3511467	0.85	0.82	56	3511521	0.67	0.63
21	3511339	0.62	0.67	59	3511376	0.81	0.88
23	100000043853	0.57	0.68	60	3511396	0.84	0.88
26	3511216	0.67	0.70	61	3511429	0.75	0.77
38	3511246	0.78	0.77	71	3512628	0.77	0.82
39	3511458	0.92	0.90	72	3511439	0.79	0.79
40	3511479	0.51	0.63	79	3511442	0.61	0.63
41	3511504	0.90	0.89	82	100000043851	0.64	0.66
43	3511513	0.85	0.87	83	3511448	0.76	0.79

Note. Analysis was conducted with a statewide population.
Note. Item sequence numbers were assigned based on the 2008 assessment.

Descriptive Statistics of Year-to-Year Core Linking Items: Grade 5 Form F

Form	Year	*N*	*M*	*SD*
F	Previous Year	30	0.69	0.15
	Year 2008	30	0.72	0.15

Table 1.31 P-Value Comparisons of Core Linking Items for Previous Year vs. Year 2008: Grade 6 Form A

Item Seq. No.	Item CID	Previous FA	Y08 FA	Item Seq. No.	Item CID	Previous FA	Y08 FA
1	3516257	0.83	0.88	37	3516329	0.62	0.60
3	3516291	0.47	0.53	38	3516355	0.66	0.70
5	3516295	0.65	0.70	44	3516351	0.51	0.52
6	3516243	0.69	0.72	46	3516249	0.67	0.67
9	3516248	0.75	0.83	49	3516573	0.67	0.75
10	3516559	0.84	0.91	51	3516242	0.38	0.47
11	3516255	0.70	0.77	52	3516281	0.44	0.50
12	3516258	0.54	0.61	53	3516354	0.72	0.70
13	3516298	0.29	0.36	55	3516332	0.51	0.52
19	3516240	0.56	0.64	56	3516256	0.60	0.61
21	3516283	0.43	0.48	57	3516302	0.69	0.69
25	3516285	0.54	0.58	62	3517000	0.51	0.58
26	3516290	0.64	0.75	68	3516613	0.55	0.54
33	3516453	0.76	0.78	69	3516313	0.83	0.79
34	3516331	0.41	0.49	70	3516318	0.88	0.87
35	3516241	0.84	0.84	79	3516323	0.67	0.69
36	3516247	0.55	0.60	80	3516303	0.53	0.55

Note. Analysis was conducted with a statewide population.
Note. Item sequence numbers were assigned based on the 2008 assessment.

Descriptive Statistics of Year-to-Year Core Linking Items: Grade 6 Form A

Form	Year	*N*	*M*	*SD*
A	Previous Year	34	0.61	0.15
	Year 2008	34	0.65	0.14

Table 1.32 P-Value Comparisons of Core Linking Items for Previous Year vs. Year 2008: Grade 6 Form F

Item Seq. No.	Item CID	Previous FF	Y08 FF	Item Seq. No.	Item CID	Previous FF	Y08 FF
3	3516291	0.47	0.54	38	3516355	0.66	0.72
4	3516625	0.84	0.91	44	3516351	0.51	0.56
5	3516295	0.65	0.70	45	3516565	0.44	0.54
6	3516243	0.69	0.73	46	3516249	0.67	0.70
9	3516248	0.75	0.85	49	3516573	0.67	0.78
10	3516559	0.84	0.92	51	3516242	0.38	0.47
11	3516255	0.70	0.77	52	1000000438	0.72	0.69
19	3516240	0.56	0.65	53	3516354	0.72	0.67
21	3516283	0.43	0.50	55	3516332	0.51	0.54
25	3516285	0.54	0.59	56	3516256	0.60	0.63
26	3516290	0.64	0.75	57	3516302	0.69	0.70
33	3516453	0.76	0.85	62	3517000	0.51	0.57
34	3516331	0.41	0.50	68	3516613	0.55	0.52
35	3516241	0.84	0.85	69	3516313	0.83	0.81
36	3516247	0.55	0.62	70	3516318	0.88	0.89
37	3516329	0.62	0.65	80	3516303	0.53	0.58

Note. Analysis was conducted with a statewide population.
Note. Item sequence numbers were assigned based on the 2008 assessment.

Descriptive Statistics of Year-to-Year Core Linking Items: Grade 6 Form F

Form	Year	*N*	*M*	*SD*
F	Previous Year	32	0.63	0.14
	Year 2008	32	0.68	0.13

Table 1.33 P-Value Comparisons of Core Linking Items for Previous Year vs. Year 2008: Grade 7 Form A

Item Seq. No.	Item CID	Previous FA	Y08 FA	Item Seq. No.	Item CID	Previous FA	Y08 FA
1	3517604	0.32	0.34	31	3517678	0.88	0.92
2	3517601	0.45	0.51	32	3517742	0.50	0.59
3	3517609	0.50	0.58	42	3517710	0.61	0.69
4	3517613	0.62	0.69	43	3517656	0.63	0.65
7	3517616	0.55	0.63	49	3547535	0.76	0.81
8	3517634	0.63	0.67	51	3517687	0.56	0.57
9	3517642	0.42	0.48	52	3517692	0.79	0.83
10	3517638	0.69	0.77	64	3517714	0.54	0.55
12	3517650	0.60	0.66	65	3517716	0.61	0.68
18	3517652	0.66	0.69	66	3517718	0.61	0.70
19	3547473	0.77	0.80	69	3517721	0.42	0.52
20	3517663	0.27	0.32	71	3517709	0.64	0.68
27	3517665	0.35	0.37	79	3555859	0.74	0.74
30	3517667	0.57	0.53	80	3517752	0.62	0.64

Note. Analysis was conducted with a statewide population.
Note. Item sequence numbers were assigned based on the 2008 assessment.

Descriptive Statistics of Year-to-Year Core Linking Items: Grade 7 Form A

Form	Year	*N*	*M*	*SD*
A	Previous Year	31	0.57	0.15
	Year 2008	31	0.61	0.14

Table 1.34 P-Value Comparisons of Core Linking Items for Previous Year vs. Year 2008: Grade 7 Form F

Item Seq. No.	Item CID	Previous FF	Y08 FF	Item Seq. No.	Item CID	Previous FF	Y08 FF
1	3517604	0.32	0.34	31	3517678	0.88	0.92
2	3517601	0.45	0.52	32	3517742	0.50	0.59
3	3517609	0.50	0.60	42	3517710	0.61	0.75
4	3517613	0.62	0.70	43	3517656	0.63	0.66
7	3517616	0.55	0.64	49	3547535	0.76	0.81
8	3517634	0.63	0.68	51	3517687	0.56	0.58
9	3517642	0.42	0.48	52	3517692	0.79	0.82
10	3517638	0.69	0.78	64	3517714	0.54	0.59
12	3517650	0.60	0.58	65	3517716	0.61	0.68
18	3517652	0.66	0.73	66	3517718	0.61	0.70
19	3547473	0.77	0.81	69	3517721	0.42	0.52
20	3517663	0.27	0.32	71	3517709	0.64	0.68
27	3517665	0.35	0.38	79	3555859	0.74	0.75
30	3517667	0.57	0.50	80	3517752	0.62	0.65

Note. Analysis was conducted with a statewide population.
Note. Item sequence numbers were assigned based on the 2008 assessment.

Descriptive Statistics of Year-to-Year Core Linking Items: Grade 7 Form F

Form	Year	*N*	*M*	*SD*
F	Previous Year	28	0.58	0.14
	Year 2008	28	0.63	0.15

Table 1.35 P-Value Comparisons of Core Linking Items for Previous Year vs. Year 2008: Grade 8 Form A

Item Seq. No.	Item CID	Previous FA	Y08 FA	Item Seq. No.	Item CID	Previous FA	Y08 FA
1	3514015	0.23	0.28	46	3514055	0.57	0.56
2	3514014	0.56	0.57	47	3514052	0.50	0.53
5	3514016	0.75	0.78	52	3514074	0.42	0.42
7	3514053	0.71	0.73	53	3514075	0.63	0.65
22	3514059	0.63	0.64	58	3514092	0.42	0.43
32	3514058	0.30	0.33	64	3514095	0.31	0.31
33	3514062	0.41	0.43	66	100000043309	0.13	0.18
38	3514291	0.73	0.75	67	3514103	0.60	0.68
41	100000043323	0.36	0.49	79	3514710	0.53	0.54
42	3514057	0.65	0.68	80	3514139	0.73	0.68
43	3514121	0.69	0.71				

Note. Analysis was conducted with a statewide population.
Note. Item sequence numbers were assigned based on the 2008 assessment.

Descriptive Statistics of Year-to-Year Core Linking Items: Grade 8 Form A

Form	Year	*N*	*M*	*SD*
A	Previous Year	21	0.52	0.18
	Year 2008	21	0.54	0.17

Table 1.36 P-Value Comparisons of Core Linking Items for Previous Year vs. Year 2008: Grade 8 Form F

Item Seq. No.	Item CID	Previous FF	Y08 FF	Item Seq. No.	Item CID	Previous FF	Y08 FF
1	3514015	0.23	0.28	46	3514055	0.57	0.59
2	3514014	0.56	0.57	47	3514052	0.50	0.53
5	3514016	0.75	0.79	50	3514056	0.79	0.77
7	3514053	0.71	0.75	52	3514074	0.42	0.46
22	3514059	0.63	0.67	53	3514075	0.63	0.66
32	3514058	0.30	0.35	58	3514092	0.42	0.44
33	3514062	0.41	0.44	64	3514095	0.31	0.31
38	3514291	0.73	0.77	65	3514174	0.58	0.52
41	100000043323	0.36	0.50	67	3514103	0.60	0.70
42	3514057	0.65	0.69	79	3514710	0.53	0.54
43	3514121	0.69	0.71	80	3514139	0.73	0.69

Note. Analysis was conducted with a statewide population.
Note. Item sequence numbers were assigned based on the 2008 assessment.

Descriptive Statistics of Year-to-Year Core Linking Items: Grade 8 Form F

Form	Year	*N*	*M*	*SD*
F	Previous Year	22	0.55	0.16
	Year 2008	22	0.58	0.15

Validation Check with the 2008 MSA-Math Core Items

As mentioned in chapter 1.4, operational items fell into one of two categories: core and core linking items. Because the core items were not included into the 2008 year-to-year linking pool, Rasch item and step difficulty parameters of the core items were reestimated with the 2008 random samples during calibration and equating. (Please see section 1.10 and appendix A for random sampling procedures) As a result, this section was prepared to provide detailed information about how much the core items changed in terms of item difficulty, both classical item p-value and Rasch item difficulty. Detailed information about the roles of the 2008 core and core linking items can be found in section 1.4, *Test Form Design, Specifications, Item Type, and Item Roles*.

As previously mentioned, 2008 Forms A, B, C, D, and E (Operational Form A) are the same, and Year 2008 Forms F, G, H, J, and K (Operational Form F) are the same except for field test items. A smaller number of cases (approximately 2,500) were available for conducting field test analyses. Both BCR and ECR item p-values were calculated by dividing the item mean score by the item score range (i.e., score point 2 for BCR and 3 for ECR). The percentage of "Omits" for each CR item was low and indicated that a small number of students did not respond at all. In general, item p-value analysis results indicated that most of the Year 2008 p-values were almost the same or somewhat increased compared to those in previous years across all grades.

With respect to Rasch item calibration, it should be at first noted that we coded "Omit" of each item as "missing" before we ran the data with the Rasch model. In general, most of the 2008 items were almost the same or somewhat easier compared to those in previous years across all grades. It should be noted that all of the Rasch item and step difficulty parameters were on a common scale (i.e., linked to the 2006 assessment).

In conclusion, both p-value and Rasch item difficulty results reflected the same phenomenon, indicating that most of the items became easier.

Table 1.37 P-Value Comparisons of Core Items for Previous Year vs. Year 2008: Grade 3 Form A

Item CID	Previous Year	Year 08 Form A	Item CID	Previous Year	Year 08 Form A
3509918	**0.76**	**0.82**	**3510073**	**0.77**	**0.79**
3595500	**0.50**	**0.54**	**3595503**	**0.47**	**0.58**
100000044161	0.63	0.66	**3510072**	**0.85**	**0.85**
3488196	0.90	0.85	**3595504**	**0.58**	**0.60**
3488126	0.89	0.87	100000044152	0.79	0.86
3509941	**0.50**	**0.58**	**3510060**	**0.84**	**0.86**
3595501	**0.40**	**0.55**	**3595505**	**0.53**	**0.58**
3496696	0.83	0.77	3487779	0.84	0.85
3509957	**0.77**	**0.80**	**3510034**	**0.30**	**0.36**
3595502	**0.43**	**0.43**	**3595506**	**0.32**	**0.38**
3488123	0.56	0.60	3488178	0.57	0.53
3548507	0.88	0.85	3496700	0.86	0.87
100000044159	0.52	0.57	3509950	0.73	0.72
3488038	0.44	0.43	3490570	0.86	0.87

Note. Bold-faced item indicates a BCR item.

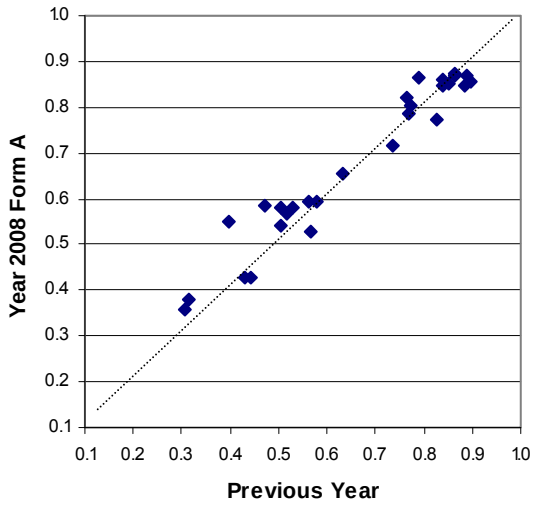


Table 1.38 Score-Point Distribution Comparisons of Constructed Response Core Items for Previous Year vs. Year 2008: Grade 3 Form A

Year	Item CID	Item Type	N	Mean	SD	Score-Point Distribution (%)				
						0	1	2	3	Omit
2007	3509918	BCR_A	29,897	0.76	0.43	22.75	76.32	N/A	N/A	0.93
2007	3595500	BCR_B	29,897	1.01	0.66	19.76	55.87	22.43	N/A	1.94
2006	3509941	BCR_A	2,845	0.50	0.50	48.61	50.40	N/A	N/A	0.98
2006	3595501	BCR_B	2,845	0.79	0.44	29.67	56.63	11.35	N/A	2.36
2007	3509957	BCR_A	29,897	0.77	0.42	21.66	77.18	N/A	N/A	1.16
2007	3595502	BCR_B	29,897	0.86	0.61	24.80	60.79	12.82	N/A	1.59
2006	3510073	BCR_A	2,860	0.77	0.42	22.66	76.92	N/A	N/A	0.42
2006	3595503	BCR_B	2,860	0.94	0.39	17.73	68.64	12.87	N/A	0.77
2007	3510072	BCR_A	29,897	0.85	0.36	13.93	85.13	N/A	N/A	0.94
2007	3595504	BCR_B	29,897	1.16	0.79	22.53	35.47	40.07	N/A	1.93
2007	3510060	BCR_A	29,897	0.84	0.37	13.69	83.95	N/A	N/A	2.36
2007	3595505	BCR_B	29,897	1.06	0.61	13.95	62.34	21.71	N/A	1.99
2007	3510034	BCR_A	29,897	0.30	0.46	68.51	30.47	N/A	N/A	1.02
2007	3595506	BCR_B	29,897	0.63	0.62	42.80	47.44	7.89	N/A	1.87
2008	3509918	BCR_A	29,364	0.82	0.38	17.44	82.14	N/A	N/A	0.41
2008	3595500	BCR_B	29,364	1.08	0.59	12.73	64.81	21.51	N/A	0.95
2008	3509941	BCR_A	29,364	0.58	0.49	41.23	57.86	N/A	N/A	0.91
2008	3595501	BCR_B	29,364	1.10	0.61	12.19	62.16	23.74	N/A	1.91
2008	3509957	BCR_A	29,364	0.80	0.40	18.50	80.16	N/A	N/A	1.33
2008	3595502	BCR_B	29,364	0.85	0.62	25.91	59.61	12.79	N/A	1.68
2008	3510073	BCR_A	29,364	0.79	0.41	20.72	78.64	N/A	N/A	0.65
2008	3595503	BCR_B	29,364	1.17	0.57	8.16	64.41	26.25	N/A	1.17
2008	3510072	BCR_A	29,364	0.85	0.36	14.45	84.99	N/A	N/A	0.56
2008	3595504	BCR_B	29,364	1.19	0.79	22.14	33.94	42.60	N/A	1.32
2008	3510060	BCR_A	29,364	0.86	0.35	12.57	86.14	N/A	N/A	1.29
2008	3595505	BCR_B	29,364	1.16	0.61	11.21	60.07	27.80	N/A	0.91
2008	3510034	BCR_A	29,364	0.36	0.48	63.43	35.62	N/A	N/A	0.95
2008	3595506	BCR_B	29,364	0.76	0.64	33.30	54.01	11.12	N/A	1.57

Table 1.39 Rasch Item and Step Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 3 Form A

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2
2007	3	3509918	BCR_A	0.2848		
2007	4	3595500	BCR_B	1.8054	-1.5584	1.5584
2004	13	100000044161	SR	0.7424		
2007	15	3488196	SR	-0.9320		
2007	18	3488126	SR	-0.8244		
2006	19	3509941	BCR_A	1.9297		
2006	20	3595501	BCR_B	2.6804	-1.6811	1.6811
2007	25	3496696	SR	-0.3314		
2007	26	3509957	BCR_A	0.1695		
2007	27	3595502	BCR_B	2.3042	-1.8051	1.8051
2007	28	3488123	SR	1.5067		
2007	29	3548507	SR	-0.5758		
2005	30	100000044159	SR	1.5728		
2007	31	3488038	SR	2.2301		
2006	36	3510073	BCR_A	0.3226		
2006	37	3595503	BCR_B	2.0893	-2.0585	2.0585
2007	42	3510072	BCR_A	-0.5702		
2007	43	3595504	BCR_B	1.3990	-0.6985	0.6985
2004	46	100000044152	SR	-0.2072		
2007	53	3510060	BCR_A	-0.4888		
2007	54	3595505	BCR_B	1.5699	-1.8116	1.8116
2007	71	3487779	SR	-0.2575		
2007	73	3510034	BCR_A	2.8934		
2007	74	3595506	BCR_B	3.0491	-1.5541	1.5541
2007	75	3488178	SR	1.5629		
2007	76	3496700	SR	-0.5360		
2006	80	3509950	SR	0.6292		
2007	81	3490570	SR	-0.5833		
2008	3	3509918	BCR_A	-0.1008		
2008	4	3595500	BCR_B	1.5690	-1.8761	1.8761
2008	13	100000044161	SR	1.0707		
2008	15	3488196	SR	-0.4959		
2008	18	3488126	SR	-0.8251		
2008	19	3509941	BCR_A	1.5122		
2008	20	3595501	BCR_B	1.5891	-1.8002	1.8002
2008	25	3496696	SR	0.3479		
2008	26	3509957	BCR_A	0.1115		
2008	27	3595502	BCR_B	2.3975	-1.7280	1.7280
2008	28	3488123	SR	1.3765		
2008	29	3548507	SR	-0.2784		
2008	30	100000044159	SR	1.5712		
2008	31	3488038	SR	2.2208		

Table 1.39 (continued)

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2
2008	36	3510073	BCR_A	0.2315		
2008	37	3595503	BCR_B	1.1948	-1.9764	1.9764
2008	42	3510072	BCR_A	-0.2447		
2008	43	3595504	BCR_B	1.5000	-0.5243	0.5243
2008	46	100000044152	SR	-0.3864		
2008	53	3510060	BCR_A	-0.4451		
2008	54	3595505	BCR_B	1.3069	-1.7023	1.7023
2008	71	3487779	SR	-0.2992		
2008	73	3510034	BCR_A	2.6680		
2008	74	3595506	BCR_B	2.6710	-1.4737	1.4737
2008	75	3488178	SR	1.7968		
2008	76	3496700	SR	-0.6248		
2008	80	3509950	SR	0.8475		
2008	81	3490570	SR	-0.4471		

Note. Rasch item and step difficulties are on a common scale.

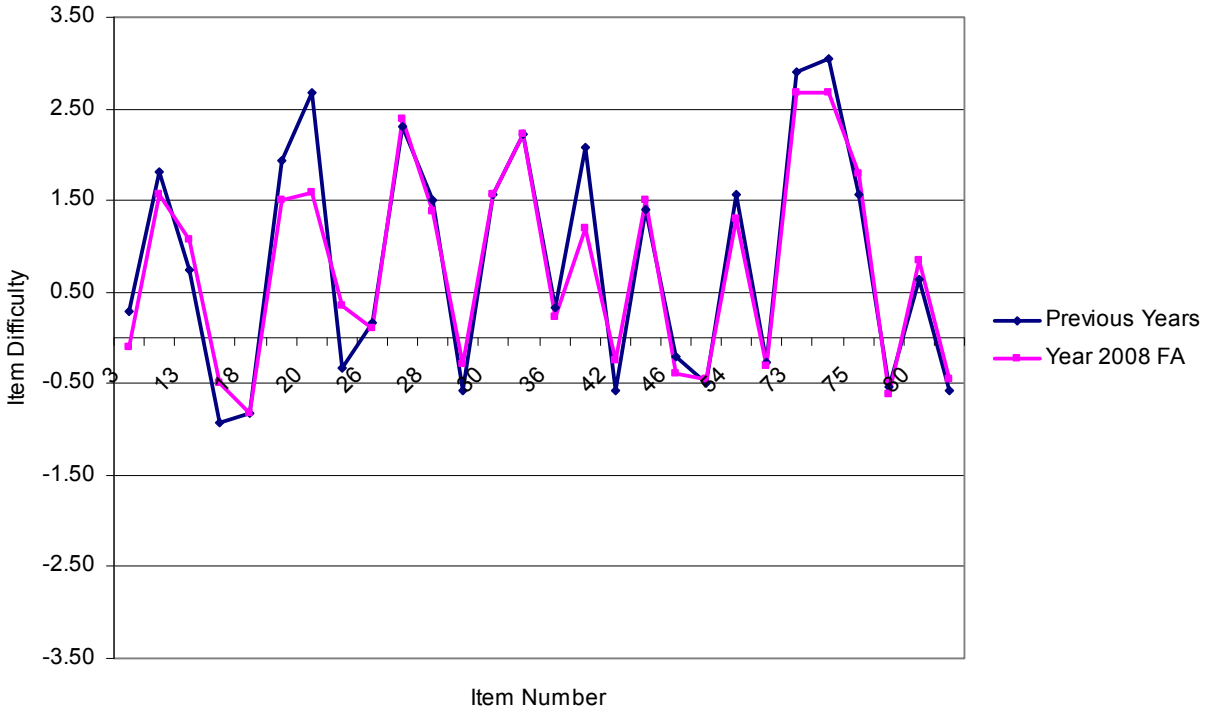


Figure 1.1 Rasch Item Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 3 Form A

Table 1.40 P-Value Comparisons of Core Items for Previous Year vs. Year 2008: Grade 3 Form F

Item CID	Previous Year	Year 08 Form F	Item CID	Previous Year	Year 08 Form F
3509918	**0.76**	**0.83**	**3509924**	**0.45**	**0.62**
3595500	**0.50**	**0.55**	**3595509**	**0.30**	**0.39**
100000044160	0.85	0.93	3488171	0.69	0.74
3488196	0.90	0.88	3488127	0.77	0.78
3509941	**0.50**	**0.58**	**3510060**	**0.84**	**0.87**
3595501	**0.40**	**0.56**	**3595505**	**0.53**	**0.59**
3487972	0.42	0.51	3488033	0.87	0.88
3509922	**0.65**	**0.67**	**3509932**	**0.98**	**0.98**
3595507	**0.34**	**0.36**	**3595510**	**0.39**	**0.44**
100000044153	0.80	0.88	3490561	0.88	0.91
100000044159	0.52	0.59	100000044162	0.80	0.83
3510067	**0.82**	**0.85**	3490570	0.86	0.87
3595508	**0.73**	**0.79**			
3488069	0.91	0.89			

Note. Bold-faced item indicates a BCR item.

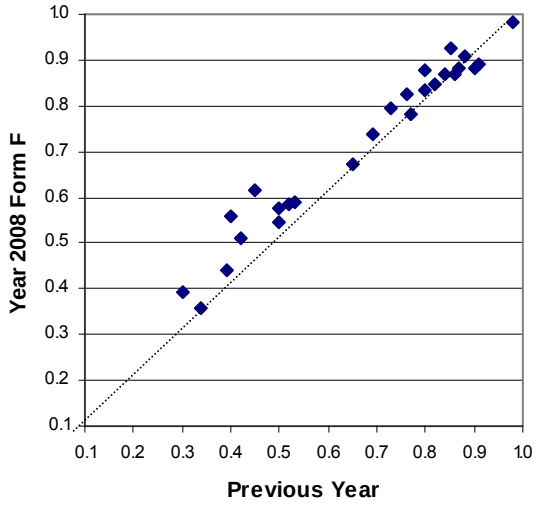


Table 1.41 Score-Point Distribution Comparisons of Constructed Response Core Items for Previous Year vs. Year 2008: Grade 3 Form F

Year	Item CID	Item Type	N	Mean	SD	Score-Point Distribution (%)				
						0	1	2	3	Omit
2007	3509918	BCR_A	29,897	0.76	0.43	22.75	76.32	N/A	N/A	0.93
2007	3595500	BCR_B	29,897	1.01	0.66	19.76	55.87	22.43	N/A	1.94
2006	3509941	BCR_A	2,845	0.50	0.50	48.61	50.40	N/A	N/A	0.98
2006	3595501	BCR_B	2,845	0.79	0.44	29.67	56.63	11.35	N/A	2.36
2007	3509922	BCR_A	29,858	0.65	0.48	32.58	65.40	N/A	N/A	2.02
2007	3595507	BCR_B	29,858	0.68	0.55	34.46	59.79	3.93	N/A	1.82
2007	3510067	BCR_A	29,858	0.82	0.38	16.14	82.47	N/A	N/A	1.40
2007	3595508	BCR_B	29,858	1.47	0.66	7.53	33.92	56.44	N/A	2.11
2006	3509924	BCR_A	2,818	0.45	0.50	53.94	45.28	N/A	N/A	0.78
2006	3595509	BCR_B	2,818	0.60	0.42	43.79	48.83	5.68	N/A	1.70
2007	3510060	BCR_A	29,897	0.84	0.37	13.69	83.95	N/A	N/A	2.36
2007	3595505	BCR_B	29,897	1.06	0.61	13.95	62.34	21.71	N/A	1.99
2007	3509932	BCR_A	29,858	0.98	0.15	1.94	97.58	N/A	N/A	0.48
2007	3595510	BCR_B	29,858	0.78	0.63	31.48	56.08	11.15	N/A	1.28
2008	3509918	BCR_A	29,253	0.83	0.38	17.02	82.58	N/A	N/A	0.40
2008	3595500	BCR_B	29,253	1.09	0.57	11.30	66.53	21.32	N/A	0.84
2008	3509941	BCR_A	29,253	0.58	0.49	41.40	57.72	N/A	N/A	0.88
2008	3595501	BCR_B	29,253	1.12	0.60	10.94	63.07	24.25	N/A	1.74
2008	3509922	BCR_A	29,253	0.67	0.47	30.34	67.24	N/A	N/A	2.42
2008	3595507	BCR_B	29,253	0.71	0.56	32.05	60.86	5.26	N/A	1.83
2008	3510067	BCR_A	29,253	0.85	0.36	14.75	84.62	N/A	N/A	0.62
2008	3595508	BCR_B	29,253	1.59	0.61	5.26	28.70	65.01	N/A	1.03
2008	3509924	BCR_A	29,253	0.62	0.49	37.80	61.59	N/A	N/A	0.60
2008	3595509	BCR_B	29,253	0.78	0.55	27.11	64.61	6.83	N/A	1.46
2008	3510060	BCR_A	29,253	0.87	0.34	12.00	87.08	N/A	N/A	0.92
2008	3595505	BCR_B	29,253	1.18	0.59	9.21	62.34	27.60	N/A	0.85
2008	3509932	BCR_A	29,253	0.98	0.14	1.31	98.07	N/A	N/A	0.63
2008	3595510	BCR_B	29,253	0.88	0.62	24.86	59.60	14.23	N/A	1.32

Table 1.42 Rasch Item and Step Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 3 Form F

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2
2007	3	3509918	BCR_A	0.2848		
2007	4	3595500	BCR_B	1.8054	-1.5584	1.5584
2004	13	100000044160	SR	-0.9180		
2007	15	3488196	SR	-0.9320		
2006	19	3509941	BCR_A	1.9297		
2006	20	3595501	BCR_B	2.6804	-1.6811	1.6811
2007	25	3487972	SR	2.2419		
2007	26	3509922	BCR_A	1.0354		
2007	27	3595507	BCR_B	3.3509	-2.2387	2.2387
2004	28	100000044153	SR	-0.3189		
2005	30	100000044159	SR	1.5728		
2007	36	3510067	BCR_A	-0.1708		
2007	37	3595508	BCR_B	0.4429	-1.0657	1.0657
2007	41	3488069	SR	-0.8242		
2006	42	3509924	BCR_A	2.1650		
2006	43	3595509	BCR_B	3.3575	-1.6247	1.6247
2007	44	3488171	SR	0.6907		
2007	46	3488127	SR	0.1633		
2007	53	3510060	BCR_A	-0.4888		
2007	54	3595505	BCR_B	1.5699	-1.8116	1.8116
2007	71	3488033	SR	-0.5635		
2007	73	3509932	BCR_A	-2.7619		
2007	74	3595510	BCR_B	2.6430	-1.5825	1.5825
2007	75	3490561	SR	-0.7637		
2004	80	100000044162	SR	-0.3580		
2007	81	3490570	SR	-0.5833		
2008	3	3509918	BCR_A	0.0751		
2008	4	3595500	BCR_B	1.6361	-1.9848	1.9848
2008	13	100000044160	SR	-1.1760		
2008	15	3488196	SR	-0.7392		
2008	19	3509941	BCR_A	1.6893		
2008	20	3595501	BCR_B	1.6043	-1.8082	1.8082
2008	25	3487972	SR	2.0271		
2008	26	3509922	BCR_A	1.0913		
2008	27	3595507	BCR_B	3.2375	-2.1210	2.1210
2008	28	100000044153	SR	-0.6268		
2008	30	100000044159	SR	1.5483		
2008	36	3510067	BCR_A	-0.2338		
2008	37	3595508	BCR_B	0.1995	-0.9490	0.9490
2008	41	3488069	SR	-0.5610		

Table 1.42 (continued)

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2
2008	42	3509924	BCR_A	1.5222		
2008	43	3595509	BCR_B	3.0387	-2.0994	2.0994
2008	44	3488171	SR	0.7136		
2008	46	3488127	SR	0.3755		
2008	53	3510060	BCR_A	-0.3562		
2008	54	3595505	BCR_B	1.2218	-1.8923	1.8923
2008	71	3488033	SR	-0.5440		
2008	73	3509932	BCR_A	-2.7407		
2008	74	3595510	BCR_B	2.4652	-1.6902	1.6902
2008	75	3490561	SR	-0.8923		
2008	80	100000044162	SR	-0.0075		
2008	81	3490570	SR	-0.5043		

Note. Rasch item and step difficulties are on a common scale.

Figure 1.2 Rasch Item Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 3 Form F

Table 1.43 P-Value Comparisons of Core Items for Previous Year vs. Year 2008: Grade 4 Form A

Item CID	Previous Year	Year 08 Form A	Item CID	Previous Year	Year 08 Form A
100000044148	**0.28**	**0.35**	3548767	0.64	0.71
3595498	**0.41**	**0.56**	**3515807**	**0.79**	**0.73**
3487996	0.68	0.76	**3595533**	**0.37**	**0.35**
3488056	0.49	0.51	3488052	0.57	0.61
3488159	0.80	0.87	**3515886**	**0.45**	**0.55**
100000044142	**0.84**	**0.82**	**3595534**	**0.52**	**0.55**
3595499	**0.40**	**0.45**	3497876	0.62	0.62
3515737	0.75	0.83	3497869	0.78	0.81
3515648	**0.50**	**0.54**	**3515843**	**0.87**	**0.89**
3595531	**0.56**	**0.56**	**3595535**	**0.55**	**0.67**
100000044144	0.90	0.94	3497867	0.65	0.64
3515823	**0.38**	**0.45**			
3595532	**0.30**	**0.40**			
100000044149	0.94	0.98			

*Bold-faced number indicates a BCR item.

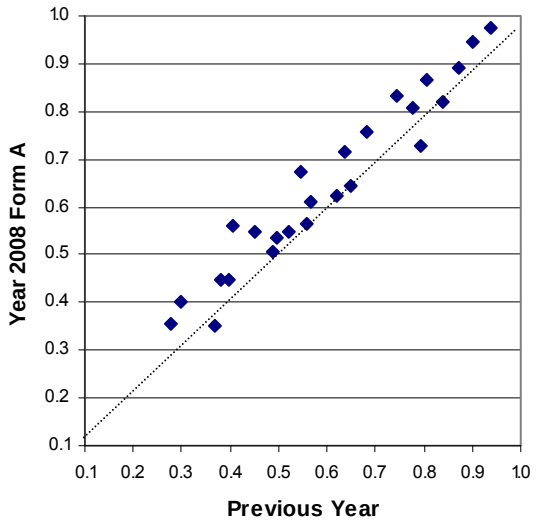


Table 1.44 Score-Point Distribution Comparisons of Constructed Response Core Items for Previous Year vs. Year 2008: Grade 4 Form A

Year	Item CID	Item Type	N	Mean	SD	Score-Point Distribution (%)				
						0	1	2	3	Omit
2005	100000044148	BCR_A	12,555	0.28	0.45	71.14	27.81	N/A	N/A	1.05
2005	3595498	BCR_B	12,555	0.82	0.48	32.66	50.27	15.64	N/A	1.43
2005	100000044142	BCR_A	12,716	0.84	0.37	14.47	84.01	N/A	N/A	1.52
2005	3595499	BCR_B	12,716	0.79	0.38	25.54	66.25	6.43	N/A	1.78
2007	3515648	BCR_A	30,402	0.50	0.50	49.35	49.60	N/A	N/A	1.05
2007	3595531	BCR_B	30,402	1.11	0.75	21.50	42.22	34.60	N/A	1.68
2006	3515823	BCR_A	2,847	0.38	0.49	57.96	37.97	N/A	N/A	4.07
2006	3595532	BCR_B	2,847	0.60	0.43	42.40	47.00	6.39	N/A	4.21
2007	3515807	BCR_A	30,402	0.79	0.41	16.33	79.31	N/A	N/A	4.36
2007	3595533	BCR_B	30,402	0.73	0.62	34.05	54.85	9.32	N/A	1.77
2007	3515886	BCR_A	30,402	0.45	0.50	51.99	44.94	N/A	N/A	3.07
2007	3595534	BCR_B	30,402	1.05	0.61	11.50	62.43	21.10	N/A	4.97
2006	3515843	BCR_A	2,847	0.87	0.34	11.87	87.04	N/A	N/A	1.09
2006	3595535	BCR_B	2,847	1.09	0.41	11.56	65.26	21.99	N/A	1.19
2008	100000044148	BCR_A	30,101	0.35	0.48	64.21	35.45	N/A	N/A	0.34
2008	3595498	BCR_B	30,101	1.12	0.59	10.82	64.20	24.12	N/A	0.87
2008	100000044142	BCR_A	30,101	0.82	0.38	16.89	82.01	N/A	N/A	1.10
2008	3595499	BCR_B	30,101	0.90	0.56	19.62	67.90	10.80	N/A	1.67
2008	3515648	BCR_A	30,101	0.54	0.50	45.53	53.57	N/A	N/A	0.89
2008	3595531	BCR_B	30,101	1.13	0.78	23.19	37.31	37.84	N/A	1.66
2008	3515823	BCR_A	30,101	0.45	0.50	54.09	44.61	N/A	N/A	1.30
2008	3595532	BCR_B	30,101	0.80	0.62	28.76	57.76	11.15	N/A	2.33
2008	3515807	BCR_A	30,101	0.73	0.45	24.02	72.76	N/A	N/A	3.23
2008	3595533	BCR_B	30,101	0.71	0.65	38.63	48.61	11.01	N/A	1.75
2008	3515886	BCR_A	30,101	0.55	0.50	43.74	54.60	N/A	N/A	1.66
2008	3595534	BCR_B	30,101	1.10	0.60	10.98	62.51	23.50	N/A	3.01
2008	3515843	BCR_A	30,101	0.89	0.31	10.31	88.99	N/A	N/A	0.70
2008	3595535	BCR_B	30,101	1.35	0.63	7.45	48.54	43.07	N/A	0.95

Table 1.45 Rasch Item and Step Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 4 Form A

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2
2005	4	100000044148	BCR_A	1.9821		
2005	5	3595498	BCR_B	1.3312	-1.2756	1.2756
2007	9	3487996	SR	0.1099		
2007	11	3488056	SR	1.3257		
2007	18	3488159	SR	-0.7155		
2005	20	100000044142	BCR_A	-1.4172		
2005	21	3595499	BCR_B	1.7059	-2.2218	2.2218
2006	23	3515737	SR	-0.3146		
2007	28	3515648	BCR_A	1.2409		
2007	29	3595531	BCR_B	0.8470	-0.9809	0.9809
2004	33	100000044144	SR	-2.3078		
2006	36	3515823	BCR_A	1.6623		
2006	37	3595532	BCR_B	2.4625	-1.5870	1.5870
2004	38	100000044149	SR	-2.7383		
2007	39	3548767	SR	0.4693		
2007	44	3515807	BCR_A	-0.7079		
2007	45	3595533	BCR_B	2.1566	-1.7285	1.7285
2007	46	3488052	SR	0.7650		
2007	51	3515886	BCR_A	1.4586		
2007	52	3595534	BCR_B	0.8111	-1.9929	1.9929
2007	62	3497876	SR	0.4661		
2007	65	3497869	SR	-0.2823		
2006	72	3515843	BCR_A	-1.3830		
2006	73	3595535	BCR_B	0.6659	-1.9576	1.9576
2007	77	3497867	SR	0.3121		
2008	4	100000044148	BCR_A	2.0901		
2008	5	3595498	BCR_B	0.7602	-1.9452	1.9452
2008	9	3487996	SR	-0.0097		
2008	11	3488056	SR	1.3222		
2008	18	3488159	SR	-1.1317		
2008	20	100000044142	BCR_A	-0.5527		
2008	21	3595499	BCR_B	1.8966	-2.1375	2.1375
2008	23	3515737	SR	-0.7461		
2008	28	3515648	BCR_A	1.2519		
2008	29	3595531	BCR_B	0.9986	-0.6913	0.6913
2008	33	100000044144	SR	-2.7781		
2008	36	3515823	BCR_A	1.6468		
2008	37	3595532	BCR_B	2.0517	-1.6746	1.6746
2008	38	100000044149	SR	-3.4118		

Table 1.45 (continued)

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2
2008	39	3548767	SR	0.0868		
2008	44	3515807	BCR_A	0.0553		
2008	45	3595533	BCR_B	2.2474	-1.2842	1.2842
2008	46	3488052	SR	0.7943		
2008	51	3515886	BCR_A	1.1277		
2008	52	3595534	BCR_B	0.8438	-2.0080	2.0080
2008	62	3497876	SR	0.7358		
2008	65	3497869	SR	-0.5937		
2008	72	3515843	BCR_A	-1.3684		
2008	73	3595535	BCR_B	0.0715	-1.6202	1.6202
2008	77	3497867	SR	0.5913		

Note. Rasch item and step difficulties are on a common scale.

Figure 1.3 Rasch Item Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 4 Form A

Table 1.46 P-Value Comparisons of Core Items for Previous Year vs. Year 2008: Grade 4 Form F

Item CID	Previous Year	Year 08 Form F	Item CID	Previous Year	Year 08 Form F
100000044150	0.50	0.64	**3595537**	**0.48**	**0.60**
3515595	**0.77**	**0.81**	3488190	0.42	0.56
3595536	**0.47**	**0.48**	3488060	0.98	0.98
3497882	0.75	0.77	**3515807**	**0.79**	**0.77**
3497866	0.69	0.71	**3595533**	**0.37**	**0.34**
3515582	0.75	0.81	3490562	0.46	0.53
100000044142	**0.84**	**0.85**	3488019	0.65	0.66
3595499	**0.40**	**0.46**	**3515783**	**0.72**	**0.75**
3515737	0.75	0.84	**3595560**	**0.66**	**0.74**
3515648	**0.50**	**0.54**	3515935	0.75	0.85
3595531	**0.56**	**0.58**	3515785	0.65	0.71
3551599	0.85	0.82	3488189	0.79	0.81
3488180	0.86	0.85	3502604	0.74	0.79
3488166	0.71	0.79	**3515830**	**0.95**	**0.95**
3515646	**0.51**	**0.63**	**3595561**	**0.71**	**0.76**

Note. Bold-faced number indicates a BCR item.

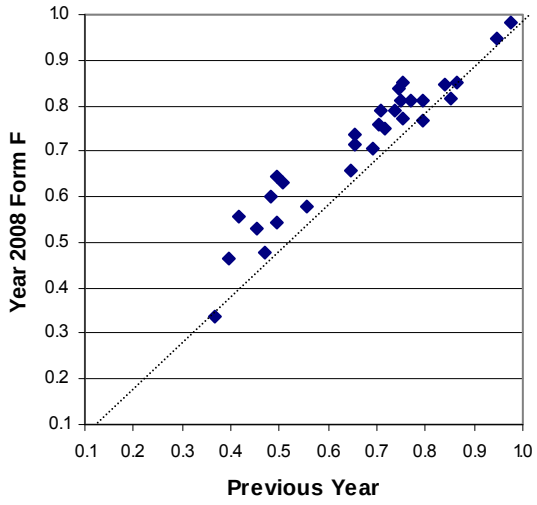


Table 1.47 Score-Point Distribution Comparisons of Constructed Response Core Items for Previous Year vs. Year 2008: Grade 4 Form F

Year	Item CID	Item Type	N	Mean	SD	Score-Point Distribution (%)				
						0	1	2	3	Omit
2007	3515595	BCR_A	30,103	0.77	0.42	21.63	77.13	N/A	N/A	1.25
2007	3595536	BCR_B	30,103	0.94	0.63	20.75	60.52	16.91	N/A	1.82
2005	100000044142	BCR_A	12,716	0.84	0.37	14.47	84.01	N/A	N/A	1.52
2005	3595499	BCR_B	12,716	0.79	0.38	25.54	66.25	6.43	N/A	1.78
2007	3515648	BCR_A	30,402	0.50	0.50	49.35	49.60	N/A	N/A	1.05
2007	3595531	BCR_B	30,402	1.11	0.75	21.50	42.22	34.60	N/A	1.68
2006	3515646	BCR_A	24,774	0.51	0.50	45.36	50.83	N/A	N/A	3.81
2006	3595537	BCR_B	24,774	0.96	0.63	37.80	19.80	38.27	N/A	4.13
2007	3515807	BCR_A	30,402	0.79	0.41	16.33	79.31	N/A	N/A	4.36
2007	3595533	BCR_B	30,402	0.73	0.62	34.05	54.85	9.32	N/A	1.77
2006	3515783	BCR_A	2,875	0.72	0.45	26.75	71.76	N/A	N/A	1.50
2006	3595560	BCR_B	2,875	1.31	0.59	22.64	20.28	55.34	N/A	1.74
2007	3515830	BCR_A	30,103	0.95	0.22	4.40	94.72	N/A	N/A	0.87
2007	3595561	BCR_B	30,103	1.41	0.59	4.28	47.72	46.68	N/A	1.32
2008	3515595	BCR_A	29,933	0.81	0.39	18.51	80.92	N/A	N/A	0.57
2008	3595536	BCR_B	29,933	0.96	0.65	21.99	57.21	19.33	N/A	1.46
2008	100000044142	BCR_A	29,933	0.85	0.36	14.33	84.76	N/A	N/A	0.91
2008	3595499	BCR_B	29,933	0.93	0.54	17.11	70.65	10.95	N/A	1.29
2008	3515648	BCR_A	29,933	0.54	0.50	44.90	54.36	N/A	N/A	0.74
2008	3595531	BCR_B	29,933	1.16	0.77	21.67	38.10	38.83	N/A	1.40
2008	3515646	BCR_A	29,933	0.63	0.48	36.05	62.96	N/A	N/A	0.99
2008	3595537	BCR_B	29,933	1.20	0.88	28.87	18.89	50.70	N/A	1.55
2008	3515807	BCR_A	29,933	0.77	0.42	22.05	76.76	N/A	N/A	1.18
2008	3595533	BCR_B	29,933	0.67	0.60	38.40	53.28	6.88	N/A	1.44
2008	3515783	BCR_A	29,933	0.75	0.43	24.51	74.97	N/A	N/A	0.51
2008	3595560	BCR_B	29,933	1.47	0.73	13.22	24.30	61.52	N/A	0.95
2008	3515830	BCR_A	29,933	0.95	0.22	4.81	94.72	N/A	N/A	0.47
2008	3595561	BCR_B	29,933	1.52	0.59	4.09	38.11	56.98	N/A	0.83

Table 1.48 Rasch Item and Step Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 4 Form F

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2
2005	3	100000044150	SR	0.7558		
2007	4	3515595	BCR_A	-0.4303		
2007	5	3595536	BCR_B	1.4549	-1.7990	1.7990
2007	9	3497882	SR	-0.2727		
2007	11	3497866	SR	0.1421		
2006	18	3515582	SR	-0.3717		
2005	20	100000044142	BCR_A	-1.4172		
2005	21	3595499	BCR_B	1.7059	-2.2218	2.2218
2006	23	3515737	SR	-0.3146		
2007	28	3515648	BCR_A	1.2409		
2007	29	3595531	BCR_B	0.8470	-0.9809	0.9809
2007	30	3551599	SR	-1.0702		
2007	31	3488180	SR	-1.0902		
2007	35	3488166	SR	0.0725		
2006	36	3515646	BCR_A	0.8899		
2006	37	3595537	BCR_B	1.0287	0.2368	-0.2368
2007	38	3488190	SR	1.5096		
2007	39	3488060	SR	-3.7018		
2007	44	3515807	BCR_A	-0.7079		
2007	45	3595533	BCR_B	2.1566	-1.7285	1.7285
2007	46	3490562	SR	1.4108		
2007	48	3488019	SR	0.1111		
2006	51	3515783	BCR_A	-0.1707		
2006	52	3595560	BCR_B	0.3296	0.1176	-0.1176
2006	53	3515935	SR	-0.3748		
2006	54	3515785	SR	0.2464		
2007	62	3488189	SR	-0.5822		
2007	63	3502604	SR	-0.1844		
2007	72	3515830	BCR_A	-2.4304		
2007	73	3595561	BCR_B	-0.5629	-1.5858	1.5858
2008	3	100000044150	SR	0.5597		
2008	4	3515595	BCR_A	-0.4856		
2008	5	3595536	BCR_B	1.4296	-1.6389	1.6389
2008	9	3497882	SR	-0.1920		
2008	11	3497866	SR	0.2397		
2008	18	3515582	SR	-0.4742		
2008	20	100000044142	BCR_A	-0.9256		
2008	21	3595499	BCR_B	1.7707	-2.2938	2.2938
2008	23	3515737	SR	-0.7523		
2008	28	3515648	BCR_A	1.1199		
2008	29	3595531	BCR_B	0.9347	-0.8467	0.8467
2008	30	3551599	SR	-0.5617		
2008	31	3488180	SR	-0.9544		
2008	35	3488166	SR	-0.4437		

Table 1.48 (continued)

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2
2008	36	3515646	BCR_A	0.6734		
2008	37	3595537	BCR_B	0.8984	0.1686	-0.1686
2008	38	3488190	SR	0.9747		
2008	39	3488060	SR	-3.8290		
2008	44	3515807	BCR_A	-0.2581		
2008	45	3595533	BCR_B	2.6447	-1.7531	1.7531
2008	46	3490562	SR	1.1949		
2008	48	3488019	SR	0.5462		
2008	51	3515783	BCR_A	-0.0713		
2008	52	3595560	BCR_B	0.1264	-0.3519	0.3519
2008	53	3515935	SR	-0.8732		
2008	54	3515785	SR	0.1771		
2008	62	3488189	SR	-0.7062		
2008	63	3502604	SR	-0.4877		
2008	72	3515830	BCR_A	-2.2268		
2008	73	3595561	BCR_B	-0.5908	-1.3955	1.3955

Note. Rasch item and step difficulties are on a common scale.

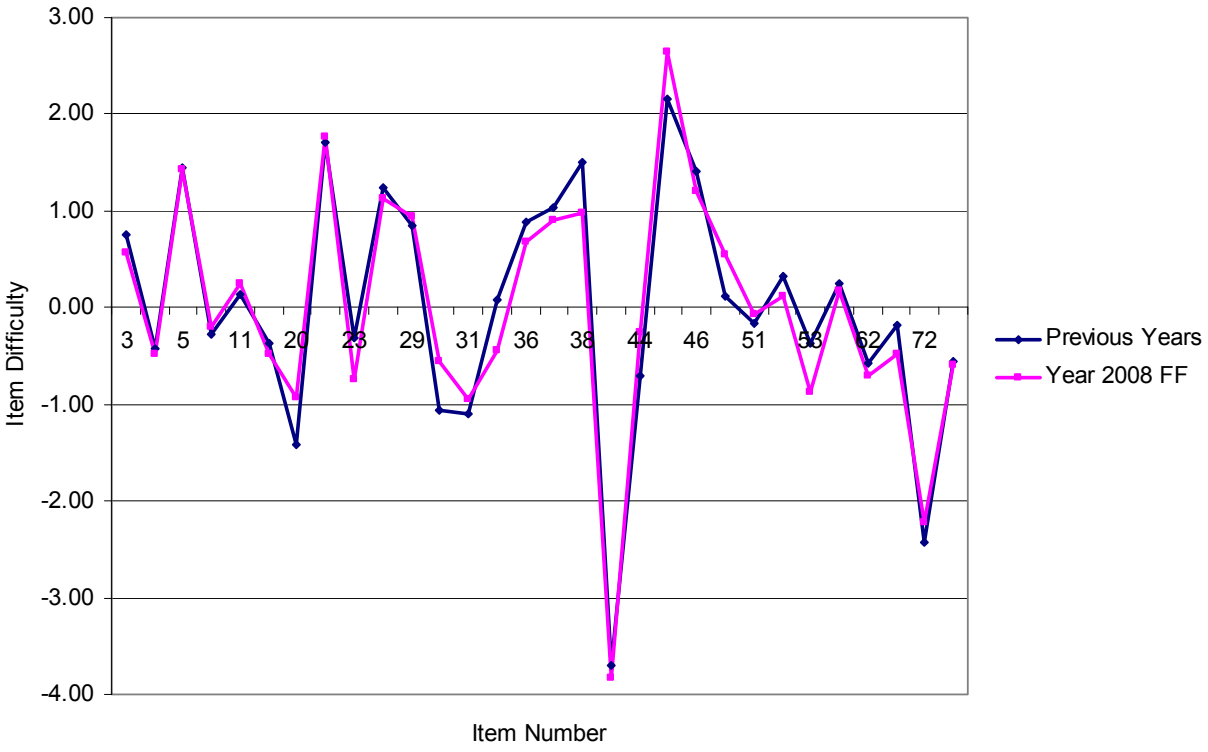


Figure 1.4 Rasch Item Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 4 Form F

Table 1.49 P-Value Comparisons of Core Items for Previous Year vs. Year 2008: Grade 5 Form A

Item CID	Previous Year	Year 08 Form A	Item CID	Previous Year	Year 08 Form A
3512642	0.53	0.63	**3595441**	**0.49**	**0.51**
3511531	**0.68**	**0.69**	3488431	0.75	0.74
3595438	**0.55**	**0.59**	**3556476**	**0.49**	**0.50**
3488390	0.39	0.44	**3595442**	**0.46**	**0.44**
3512622	0.60	0.68	3488241	0.91	0.91
3488506	0.41	0.40	100000043857	0.76	0.82
3488373	0.68	0.66	**3512618**	**0.45**	**0.46**
3512639	0.75	0.80	**3595443**	**0.52**	**0.55**
3512615	**0.78**	**0.79**	3512623	0.73	0.79
3595439	**0.47**	**0.55**	3488251	0.59	0.61
3511336	**0.33**	**0.43**	**3512564**	**0.31**	**0.36**
3595440	**0.34**	**0.38**	**3595444**	**0.22**	**0.32**
3488324	0.76	0.75	**3512644**	**0.30**	**0.37**
3488272	0.56	0.56	**3595445**	**0.39**	**0.47**
3511258	**0.81**	**0.84**	3488328	0.72	0.71

Note. Bold-faced number indicates a BCR or ECR item.

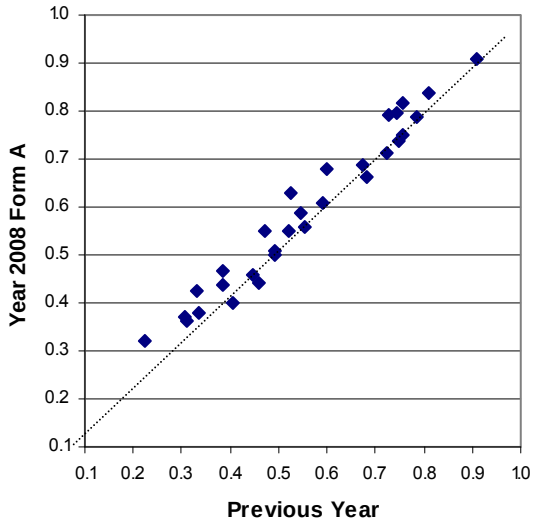


Table 1.50 Score-Point Distribution Comparisons of Constructed Response Core Items for Previous Year vs. Year 2008: Grade 5 Form A

Year	Item CID	Item Type	N	Mean	SD	Score-Point Distribution (%)				
						0	1	2	3	Omit
2007	3511531	BCR_A	31,083	0.68	0.47	31.32	67.50	N/A	N/A	1.18
2007	3595438	BCR_B	31,083	1.10	0.65	15.05	56.26	26.61	N/A	2.08
2006	3512615	BCR_A	2,909	0.79	0.41	20.45	78.48	N/A	N/A	1.07
2006	3595439	BCR_B	2,909	0.94	0.45	22.28	58.58	17.81	N/A	1.34
2007	3511336	BCR_A	31,083	0.33	0.47	62.30	32.99	N/A	N/A	4.71
2007	3595440	BCR_B	31,083	0.67	0.70	40.87	39.81	13.67	N/A	5.66
2007	3511258	ECR_A	31,083	0.81	0.39	16.62	81.19	N/A	N/A	2.18
2007	3595441	ECR_B	31,083	1.48	0.69	2.53	51.80	37.02	7.44	1.22
2007	3556476	BCR_A	31,083	0.49	0.50	48.34	49.38	N/A	N/A	2.28
2007	3595442	BCR_B	31,083	0.92	0.92	43.72	14.72	38.42	N/A	3.15
2007	3512618	BCR_A	31,083	0.45	0.50	52.54	44.54	N/A	N/A	2.92
2007	3595443	BCR_B	31,083	1.05	0.52	7.46	72.60	15.99	N/A	3.95
2006	3512564	BCR_A	25,372	0.31	0.46	63.25	31.04	N/A	N/A	5.71
2006	3595444	BCR_B	25,372	0.44	0.38	51.10	39.71	2.34	N/A	6.85
2006	3512644	BCR_A	2,909	0.31	0.46	64.46	30.46	N/A	N/A	5.09
2006	3595445	BCR_B	2,909	0.77	0.54	37.85	36.51	20.25	N/A	5.40
2008	3511531	BCR_A	30,537	0.69	0.46	30.23	68.94	N/A	N/A	0.84
2008	3595438	BCR_B	30,537	1.18	0.68	13.87	51.27	33.19	N/A	1.68
2008	3512615	BCR_A	30,537	0.79	0.41	19.92	78.87	N/A	N/A	1.21
2008	3595439	BCR_B	30,537	1.10	0.68	16.68	53.00	28.44	N/A	1.88
2008	3511336	BCR_A	30,537	0.43	0.49	52.23	42.61	N/A	N/A	5.16
2008	3595440	BCR_B	30,537	0.75	0.75	36.69	37.97	18.73	N/A	6.61
2008	3511258	ECR_A	30,537	0.84	0.37	14.75	83.89	N/A	N/A	1.37
2008	3595441	ECR_B	30,537	1.53	0.64	2.35	45.36	46.42	4.87	1.00
2008	3556476	BCR_A	30,537	0.50	0.50	48.14	49.87	N/A	N/A	1.98
2008	3595442	BCR_B	30,537	0.88	0.91	45.22	15.45	36.46	N/A	2.86
2008	3512618	BCR_A	30,537	0.46	0.50	51.62	45.78	N/A	N/A	2.60
2008	3595443	BCR_B	30,537	1.10	0.54	6.93	69.45	20.45	N/A	3.17
2008	3512564	BCR_A	30,537	0.36	0.48	60.11	36.30	N/A	N/A	3.59
2008	3595444	BCR_B	30,537	0.64	0.60	39.26	51.16	6.54	N/A	3.04
2008	3512644	BCR_A	30,537	0.37	0.48	58.24	36.89	N/A	N/A	4.88
2008	3595445	BCR_B	30,537	0.93	0.76	26.55	42.24	25.38	N/A	5.83

Table 1.51 Rasch Item and Step Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 5 Form A

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2006	3	3512642	SR	0.8800			
2007	4	3511531	BCR_A	0.0868			
2007	5	3595438	BCR_B	0.6862	-1.6106	1.6106	
2007	6	3488390	SR	1.6511			
2006	7	3512622	SR	0.5443			
2007	9	3488506	SR	1.4501			
2007	18	3488373	SR	0.2052			
2006	22	3512639	SR	-0.3576			
2006	24	3512615	BCR_A	-0.6075			
2006	25	3595439	BCR_B	1.2646	-1.6156	1.6156	
2007	35	3511336	BCR_A	1.8944			
2007	36	3595440	BCR_B	1.9609	-1.0144	1.0144	
2007	42	3488324	SR	-0.4943			
2007	44	3488272	SR	0.6757			
2007	45	3511258	ECR_A	-1.0768			
2007	46	3595441	ECR_B	0.6008	-3.6557	0.5929	3.0628
2007	48	3488431	SR	-0.2493			
2007	52	3556476	BCR_A	1.0216			
2007	53	3595442	BCR_B	1.2214	0.5363	-0.5363	
2007	57	3488241	SR	-1.7907			
2005	58	100000043857	SR	-0.7469			
2007	62	3512618	BCR_A	1.2891			
2007	63	3595443	BCR_B	0.6654	-2.4487	2.4487	
2006	64	3512623	SR	-0.3171			
2007	71	3488251	SR	0.5631			
2006	73	3512564	BCR_A	1.9152			
2006	74	3595444	BCR_B	3.1486	-1.8742	1.8742	
2006	80	3512644	BCR_A	2.0909			
2006	81	3595445	BCR_B	1.6112	-0.7732	0.7732	
2007	82	3488328	SR	-0.2008			
2008	3	3512642	SR	0.4442			
2008	4	3511531	BCR_A	0.1259			
2008	5	3595438	BCR_B	0.5335	-1.3908	1.3908	
2008	6	3488390	SR	1.4804			
2008	7	3512622	SR	0.2133			
2008	9	3488506	SR	1.7536			
2008	18	3488373	SR	0.1790			
2008	22	3512639	SR	-0.4690			
2008	24	3512615	BCR_A	-0.5151			
2008	25	3595439	BCR_B	0.8697	-1.4537	1.4537	
2008	35	3511336	BCR_A	1.4848			
2008	36	3595440	BCR_B	1.7477	-0.8139	0.8139	
2008	42	3488324	SR	-0.2851			
2008	44	3488272	SR	0.8010			

Table 1.51 (continued)

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2008	45	3511258	ECR_A	-1.0546			
2008	46	3595441	ECR_B	0.9016	-3.8291	0.2550	3.5741
2008	48	3488431	SR	-0.2130			
2008	52	3556476	BCR_A	1.2085			
2008	53	3595442	BCR_B	1.3852	0.6408	-0.6408	
2008	57	3488241	SR	-1.7928			
2008	58	100000043857	SR	-0.9439			
2008	62	3512618	BCR_A	1.3098			
2008	63	3595443	BCR_B	0.5173	-2.2969	2.2969	
2008	64	3512623	SR	-0.5862			
2008	71	3488251	SR	0.5581			
2008	73	3512564	BCR_A	1.7934			
2008	74	3595444	BCR_B	2.3824	-1.8916	1.8916	
2008	80	3512644	BCR_A	1.8531			
2008	81	3595445	BCR_B	1.3274	-0.9532	0.9532	
2008	82	3488328	SR	-0.0717			

Note. Rasch item and step difficulties are on a common scale.

Figure 1.5 Rasch Item Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 5 Form A

Table 1.52 P-Value Comparisons of Core Items for Previous Year vs. Year 2008: Grade 5 Form F

Item CID	Previous Year	Year 08 Form F	Item CID	Previous Year	Year 08 Form F
3512642	0.53	0.63	3488324	0.76	0.76
3511531	**0.68**	**0.71**	**3511258**	**0.81**	**0.84**
3595438	**0.55**	**0.60**	**3595441**	**0.49**	**0.52**
3488390	0.39	0.44	3488431	0.75	0.75
3512622	0.60	0.69	**3556476**	**0.49**	**0.51**
3488356	0.75	0.78	**3595442**	**0.46**	**0.46**
3488373	0.68	0.67	3488418	0.39	0.46
100000043850	0.45	0.64	3488372	0.86	0.85
3512639	0.75	0.80	**3512618**	**0.45**	**0.47**
3512615	**0.78**	**0.81**	**3595443**	**0.52**	**0.55**
3595439	**0.47**	**0.58**	3488455	0.87	0.92
100000043855	0.28	0.40	3488299	0.61	0.63
3488377	0.73	0.71	3488457	0.47	0.48
3511542	0.47	0.65	**3512564**	**0.31**	**0.36**
3511336	**0.33**	**0.43**	**3595444**	**0.22**	**0.30**
3595440	**0.34**	**0.39**	**3512644**	**0.30**	**0.38**
3492137	0.68	0.79	**3595445**	**0.39**	**0.48**

Note. Bold-faced number indicates a BCR or ECR item.

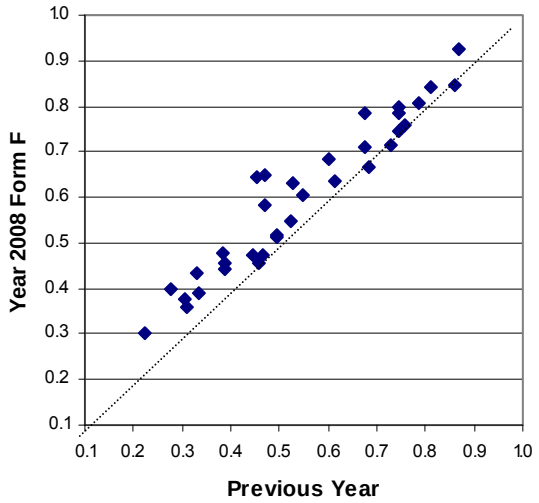


Table 1.53 Score-Point Distribution Comparisons of Constructed Response Core Items for Previous Year vs. Year 2008: Grade 5 Form F

Year	Item CID	Item Type	N	Mean	SD	Score-Point Distribution (%)				
						0	1	2	3	Omit
2007	3511531	BCR_A	31,083	0.68	0.47	31.32	67.50	N/A	N/A	1.18
2007	3595438	BCR_B	31,083	1.10	0.65	15.05	56.26	26.61	N/A	2.08
2006	3512615	BCR_A	2,909	0.79	0.41	20.45	78.48	N/A	N/A	1.07
2006	3595439	BCR_B	2,909	0.94	0.45	22.28	58.58	17.81	N/A	1.34
2007	3511336	BCR_A	31,083	0.33	0.47	62.30	32.99	N/A	N/A	4.71
2007	3595440	BCR_B	31,083	0.67	0.70	40.87	39.81	13.67	N/A	5.66
2007	3511258	ECR_A	31,083	0.81	0.39	16.62	81.19	N/A	N/A	2.18
2007	3595441	ECR_B	31,083	1.48	0.69	2.53	51.80	37.02	7.44	1.22
2007	3556476	BCR_A	31,083	0.49	0.50	48.34	49.38	N/A	N/A	2.28
2007	3595442	BCR_B	31,083	0.92	0.92	43.72	14.72	38.42	N/A	3.15
2007	3512618	BCR_A	31,083	0.45	0.50	52.54	44.54	N/A	N/A	2.92
2007	3595443	BCR_B	31,083	1.05	0.52	7.46	72.60	15.99	N/A	3.95
2006	3512564	BCR_A	25,372	0.31	0.46	63.25	31.04	N/A	N/A	5.71
2006	3595444	BCR_B	25,372	0.44	0.38	51.10	39.71	2.34	N/A	6.85
2006	3512644	BCR_A	2,909	0.31	0.46	64.46	30.46	N/A	N/A	5.09
2006	3595445	BCR_B	2,909	0.77	0.54	37.85	36.51	20.25	N/A	5.40
2008	3511531	BCR_A	30,289	0.71	0.45	28.53	70.81	N/A	N/A	0.66
2008	3595438	BCR_B	30,289	1.21	0.64	10.64	54.67	33.14	N/A	1.55
2008	3512615	BCR_A	30,289	0.81	0.39	18.37	80.80	N/A	N/A	0.82
2008	3595439	BCR_B	30,289	1.17	0.68	14.73	51.11	32.82	N/A	1.33
2008	3511336	BCR_A	30,289	0.43	0.50	52.72	43.34	N/A	N/A	3.94
2008	3595440	BCR_B	30,289	0.78	0.75	36.80	38.18	19.88	N/A	5.15
2008	3511258	ECR_A	30,289	0.84	0.37	14.61	84.11	N/A	N/A	1.28
2008	3595441	ECR_B	30,289	1.55	0.63	2.00	44.03	48.35	4.79	0.82
2008	3556476	BCR_A	30,289	0.51	0.50	46.75	51.39	N/A	N/A	1.86
2008	3595442	BCR_B	30,289	0.91	0.91	44.12	15.65	37.73	N/A	2.49
2008	3512618	BCR_A	30,289	0.47	0.50	50.34	47.19	N/A	N/A	2.47
2008	3595443	BCR_B	30,289	1.10	0.51	5.27	73.28	18.29	N/A	3.16
2008	3512564	BCR_A	30,289	0.36	0.48	61.06	35.98	N/A	N/A	2.97
2008	3595444	BCR_B	30,289	0.61	0.60	42.73	48.52	6.13	N/A	2.62
2008	3512644	BCR_A	30,289	0.38	0.49	58.06	37.86	N/A	N/A	4.08
2008	3595445	BCR_B	30,289	0.96	0.75	25.48	43.48	26.09	N/A	4.95

Table 1.54 Rasch Item and Step Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 5 Form F

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2006	3	3512642	SR	0.8800			
2007	4	3511531	BCR_A	0.0868			
2007	5	3595438	BCR_B	0.6862	-1.6106	1.6106	
2007	6	3488390	SR	1.6511			
2006	7	3512622	SR	0.5443			
2007	9	3488356	SR	-0.3278			
2007	18	3488373	SR	0.2052			
2004	20	100000043850	SR	0.6431			
2006	22	3512639	SR	-0.3576			
2006	24	3512615	BCR_A	-0.6075			
2006	25	3595439	BCR_B	1.2646	-1.6156	1.6156	
2005	27	100000043855	SR	1.9156			
2007	28	3488377	SR	-0.1395			
2006	34	3511542	SR	1.1084			
2007	35	3511336	BCR_A	1.8944			
2007	36	3595440	BCR_B	1.9609	-1.0144	1.0144	
2007	37	3492137	SR	-0.0612			
2007	42	3488324	SR	-0.4943			
2007	45	3511258	ECR_A	-1.0768			
2007	46	3595441	ECR_B	0.6008	-3.6557	0.5929	3.0628
2007	48	3488431	SR	-0.2493			
2007	52	3556476	BCR_A	1.0216			
2007	53	3595442	BCR_B	1.2214	0.5363	-0.5363	
2007	57	3488418	SR	1.5806			
2007	58	3488372	SR	-1.1803			
2007	62	3512618	BCR_A	1.2891			
2007	63	3595443	BCR_B	0.6654	-2.4487	2.4487	
2007	64	3488455	SR	-1.4423			
2007	69	3488299	SR	0.3609			
2007	70	3488457	SR	1.2553			
2006	73	3512564	BCR_A	1.9152			
2006	74	3595444	BCR_B	3.1486	-1.8742	1.8742	
2006	80	3512644	BCR_A	2.0909			
2006	81	3595445	BCR_B	1.6112	-0.7732	0.7732	
2008	3	3512642	SR	0.5603			
2008	4	3511531	BCR_A	0.0205			
2008	5	3595438	BCR_B	0.3914	-1.6521	1.6521	
2008	6	3488390	SR	1.5155			
2008	7	3512622	SR	0.1285			
2008	9	3488356	SR	-0.4351			
2008	18	3488373	SR	0.0790			
2008	20	100000043850	SR	0.2307			
2008	22	3512639	SR	-0.6094			
2008	24	3512615	BCR_A	-0.6929			

Table 1.54 (continued)

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2008	25	3595439	BCR_B	0.7258	-1.4307	1.4307	
2008	27	100000043855	SR	1.6760			
2008	28	3488377	SR	0.0327			
2008	34	3511542	SR	0.3252			
2008	35	3511336	BCR_A	1.5666			
2008	36	3595440	BCR_B	1.8347	-0.9254	0.9254	
2008	37	3492137	SR	-0.5120			
2008	42	3488324	SR	-0.1710			
2008	45	3511258	ECR_A	-1.0108			
2008	46	3595441	ECR_B	0.8865	-4.0748	0.2841	3.7906
2008	48	3488431	SR	-0.2189			
2008	52	3556476	BCR_A	1.0842			
2008	53	3595442	BCR_B	1.3952	0.5900	-0.5900	
2008	57	3488418	SR	1.4472			
2008	58	3488372	SR	-1.1720			
2008	62	3512618	BCR_A	1.3102			
2008	63	3595443	BCR_B	0.5023	-2.7505	2.7505	
2008	64	3488455	SR	-1.9347			
2008	69	3488299	SR	0.4209			
2008	70	3488457	SR	1.2508			
2008	73	3512564	BCR_A	2.0012			
2008	74	3595444	BCR_B	2.6476	-1.6217	1.6217	
2008	80	3512644	BCR_A	1.8003			
2008	81	3595445	BCR_B	1.2216	-0.9532	0.9532	

Note. Rasch item and step difficulties are on a common scale.

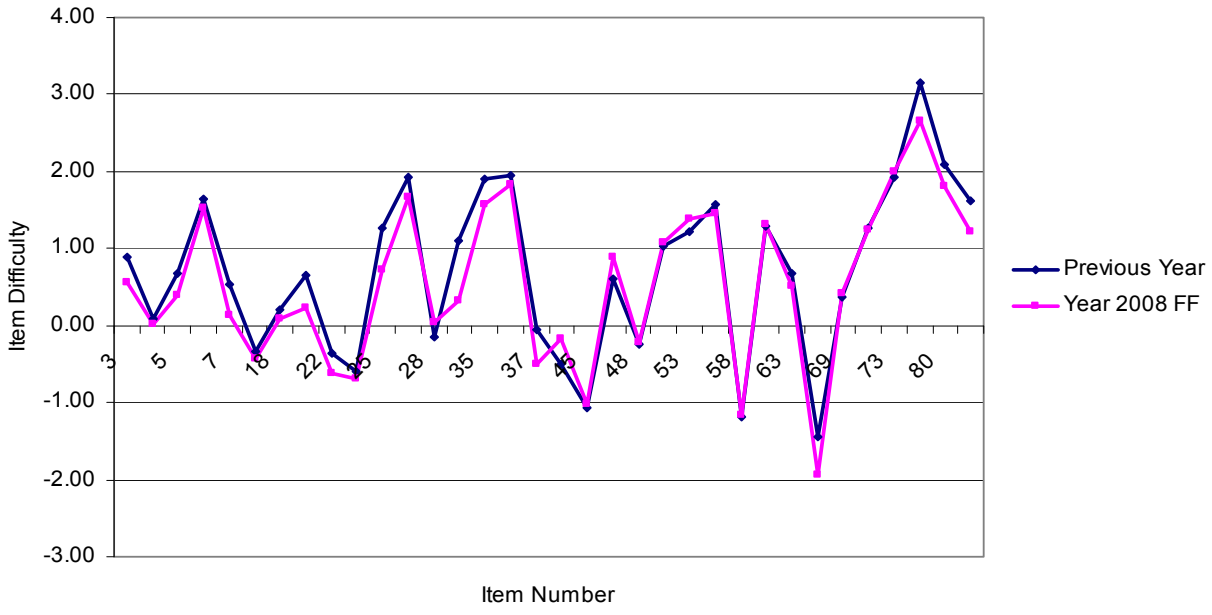


Figure 1.6 Rasch Item Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 5 Form F

Table 1.55 P-Value Comparisons of Core Items for Previous Year vs. Year 2008: Grade 6 Form A

Item CID	Previous Year	Year 08 Form A	Item CID	Previous Year	Year 08 Form A
3488264	0.59	0.68	3492095	0.78	0.80
3492143	0.71	0.77	**3516333**	**0.60**	**0.62**
3517004	**0.87**	**0.89**	**3595449**	**0.61**	**0.59**
3595446	**0.58**	**0.63**	3516929	0.66	0.65
3516909	0.51	0.59	3516906	0.55	0.60
3516627	**0.52**	**0.48**	3492142	0.58	0.63
3595447	**0.42**	**0.41**	**3517013**	**0.35**	**0.57**
3488482	0.78	0.84	**3595450**	**0.57**	**0.71**
100000043862	0.49	0.61	3516375	0.55	0.61
3488383	0.67	0.67	**3516616**	**0.40**	**0.42**
3488516	0.64	0.69	**3595451**	**0.49**	**0.50**
100000043865	0.43	0.53	3488508	0.68	0.71
3516363	**0.33**	**0.48**	**3516913**	**0.32**	**0.40**
3595448	**0.48**	**0.60**	**3595452**	**0.42**	**0.54**

Note. Bold-faced number indicates a BCR or ECR item.

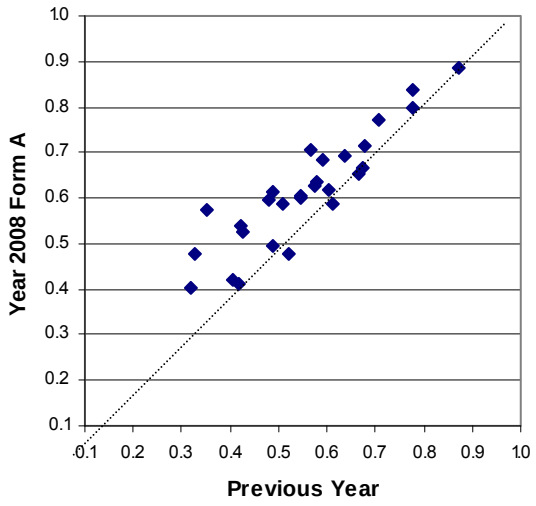


Table 1.56 Score-Point Distribution Comparisons of Constructed Response Core Items for Previous Year vs. Year 2008: Grade 6 Form A

Year	Item CID	Item Type	N	Mean	SD	Score-Point Distribution (%)				
						0	1	2	3	Omit
2007	3517004	ECR_A	31,258	0.87	0.34	11.36	87.09	N/A	N/A	1.55
2007	3595446	ECR_B	31,258	1.74	0.96	8.71	29.21	34.34	25.26	2.49
2007	3516627	BCR_A	31,558	0.52	0.50	41.66	52.17	N/A	N/A	6.17
2007	3595447	BCR_B	31,558	0.83	0.61	22.28	59.64	11.87	N/A	6.21
2006	3516363	BCR_A	3,289	0.33	0.47	62.51	32.75	N/A	N/A	4.74
2006	3595448	BCR_B	3,289	0.96	0.56	28.79	36.58	29.61	N/A	5.02
2007	3516333	BCR_A	31,558	0.60	0.49	37.60	60.47	N/A	N/A	1.93
2007	3595449	BCR_B	31,558	1.22	0.81	21.05	29.56	46.28	N/A	3.11
2007	3517013	BCR_A	31,558	0.35	0.48	61.55	35.38	N/A	N/A	3.07
2007	3595450	BCR_B	31,558	1.13	0.63	10.29	59.17	27.04	N/A	3.50
2007	3516616	BCR_A	31,258	0.40	0.49	55.22	40.43	N/A	N/A	4.34
2007	3595451	BCR_B	31,258	0.98	0.60	14.55	63.53	17.12	N/A	4.80
2006	3516913	BCR_A	3,242	0.32	0.47	60.33	31.89	N/A	N/A	7.77
2006	3595452	BCR_B	3,242	0.85	0.51	26.56	45.96	19.25	N/A	8.24
2008	3517004	ECR_A	31,060	0.89	0.32	10.64	88.75	N/A	N/A	0.61
2008	3595446	ECR_B	31,060	1.90	0.94	6.39	25.68	34.10	32.13	1.70
2008	3516627	BCR_A	31,060	0.48	0.50	45.52	47.79	N/A	N/A	6.69
2008	3595447	BCR_B	31,060	0.82	0.67	24.69	52.36	14.89	N/A	8.06
2008	3516363	BCR_A	31,060	0.48	0.50	49.59	47.80	N/A	N/A	2.61
2008	3595448	BCR_B	31,060	1.19	0.79	19.70	34.36	42.49	N/A	3.45
2008	3516333	BCR_A	31,060	0.62	0.49	36.21	61.65	N/A	N/A	2.14
2008	3595449	BCR_B	31,060	1.18	0.77	18.93	37.54	40.05	N/A	3.48
2008	3517013	BCR_A	31,060	0.57	0.49	39.91	57.45	N/A	N/A	2.65
2008	3595450	BCR_B	31,060	1.41	0.64	5.19	42.07	49.52	N/A	3.22
2008	3516616	BCR_A	31,060	0.42	0.49	51.83	42.07	N/A	N/A	6.11
2008	3595451	BCR_B	31,060	0.99	0.62	12.77	61.83	18.73	N/A	6.67
2008	3516913	BCR_A	31,060	0.40	0.49	57.57	40.49	N/A	N/A	1.94
2008	3595452	BCR_B	31,060	1.08	0.66	15.60	55.54	26.28	N/A	2.59

Table 1.57 Rasch Item and Step Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 6 Form A

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2007	2	3488264	SR	0.1759			
2007	4	3492143	SR	-0.4941			
2007	7	3517004	ECR_A	-1.7238			
2007	8	3595446	ECR_B	0.2493	-1.6097	0.1701	1.4396
2006	20	3516909	SR	0.4392			
2007	22	3516627	BCR_A	0.4728			
2007	23	3595447	BCR_B	1.265	-1.8927	1.8927	
2007	24	3488482	SR	-1.0259			
2004	27	100000043862	SR	0.0659			
2007	28	3488383	SR	-0.3426			
2007	29	3488516	SR	-0.1093			
2004	30	100000043865	SR	0.4276			
2006	31	3516363	BCR_A	1.3465			
2006	32	3595448	BCR_B	0.4811	-0.7058	0.7058	
2007	45	3492095	SR	-0.8005			
2007	47	3516333	BCR_A	0.1031			
2007	48	3595449	BCR_B	0.1124	-0.4274	0.4274	
2006	50	3516929	SR	-0.3587			
2006	54	3516906	SR	0.2547			
2007	58	3492142	SR	0.2448			
2007	59	3517013	BCR_A	1.4674			
2007	60	3595450	BCR_B	0.0865	-1.7954	1.7954	
2006	61	3516375	SR	0.1983			
2007	66	3516616	BCR_A	1.1174			
2007	67	3595451	BCR_B	0.5414	-1.8777	1.8777	
2007	71	3488508	SR	-0.2951			
2006	77	3516913	BCR_A	1.3788			
2006	78	3595452	BCR_B	0.8083	-1.1885	1.1885	
2008	2	3488264	SR	-0.0691			
2008	4	3492143	SR	-0.6658			
2008	7	3517004	ECR_A	-1.7891			
2008	8	3595446	ECR_B	0.1623	-1.8832	0.1382	1.7450
2008	20	3516909	SR	0.4042			
2008	22	3516627	BCR_A	0.8724			
2008	23	3595447	BCR_B	1.4503	-1.6293	1.6293	
2008	24	3488482	SR	-1.3990			
2008	27	100000043862	SR	0.2101			
2008	28	3488383	SR	-0.1255			

Table 1.57 (continued)

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2008	29	3488516	SR	-0.1462			
2008	30	100000043865	SR	0.7262			
2008	31	3516363	BCR_A	0.9993			
2008	32	3595448	BCR_B	0.2927	-0.7056	0.7056	
2008	45	3492095	SR	-0.9261			
2008	47	3516333	BCR_A	0.1802			
2008	48	3595449	BCR_B	0.3670	-0.8656	0.8656	
2008	50	3516929	SR	0.0810			
2008	54	3516906	SR	0.2864			
2008	58	3492142	SR	0.1475			
2008	59	3517013	BCR_A	0.4029			
2008	60	3595450	BCR_B	-0.6751	-1.4158	1.4158	
2008	61	3516375	SR	0.2607			
2008	66	3516616	BCR_A	1.2017			
2008	67	3595451	BCR_B	0.6973	-2.0205	2.0205	
2008	71	3488508	SR	-0.3096			
2008	77	3516913	BCR_A	1.3284			
2008	78	3595452	BCR_B	0.4845	-1.4754	1.4754	

Note. Rasch item and step difficulties are on a common scale.

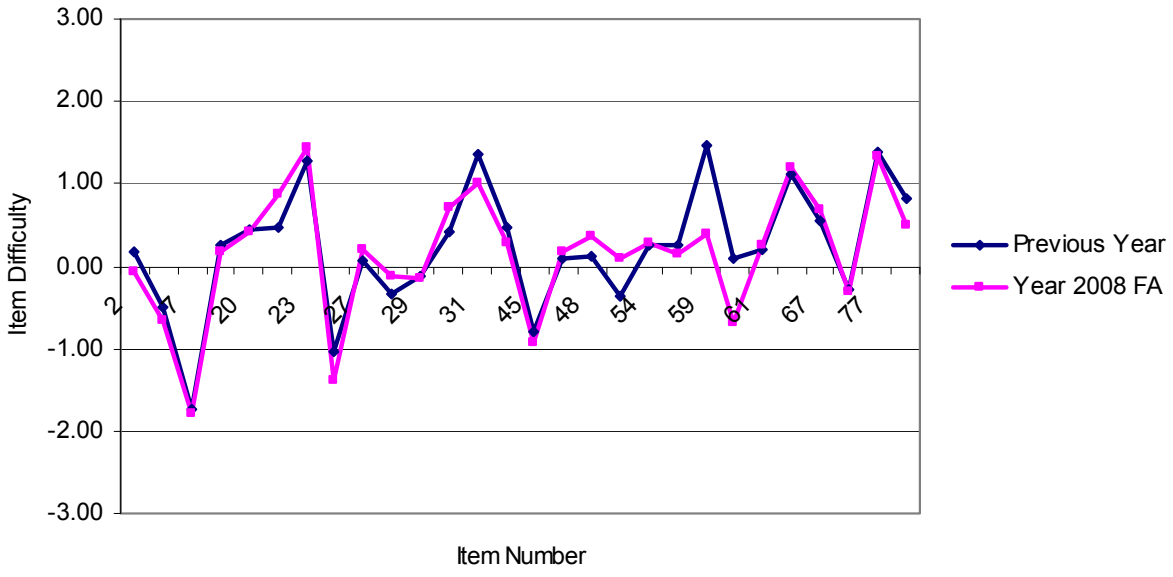


Figure 1.7 Rasch Item Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 6 Form A

Table 1.58 P-Value Comparisons of Core Items for Previous Year vs. Year 2008: Grade 6 Form F

Item CID	Previous Year	Year 08 Form F	Item CID	Previous Year	Year 08 Form F
3488502	0.89	0.91	**3516333**	**0.60**	**0.64**
3516923	**0.64**	**0.78**	**3595449**	**0.61**	**0.61**
3595453	**0.36**	**0.51**	3516929	0.66	0.73
3516361	0.57	0.70	3516906	0.55	0.61
3492088	0.85	0.87	3488256	0.62	0.61
3516909	0.51	0.61	**3517013**	**0.35**	**0.57**
3516627	**0.52**	**0.54**	**3595450**	**0.57**	**0.71**
3595447	**0.42**	**0.46**	3516375	0.55	0.62
3488441	0.52	0.55	**3516616**	**0.40**	**0.41**
100000043862	0.49	0.64	**3595451**	**0.49**	**0.50**
3488263	0.77	0.79	3488508	0.68	0.73
3488500	0.84	0.89	**3516327**	**0.44**	**0.44**
100000043865	0.43	0.53	**3595455**	**0.59**	**0.61**
3516628	**0.22**	**0.24**	3488257	0.71	0.74
3595454	**0.32**	**0.42**			

Note. Bold-faced number indicates a BCR or ECR item.

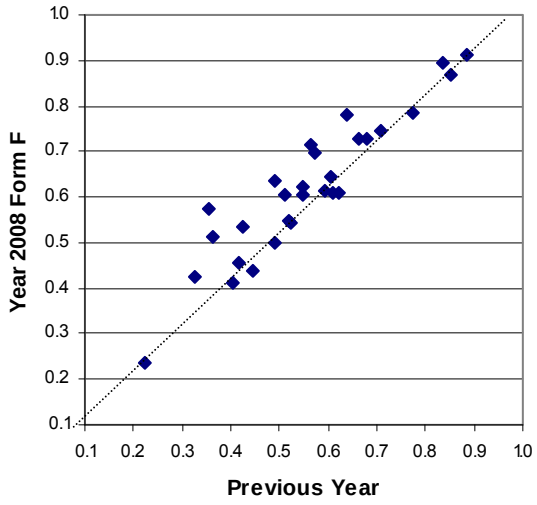


Table 1.59 Score-Point Distribution Comparisons of Constructed Response Core Items for Previous Year vs. Year 2008: Grade 6 Form F

Year	Item CID	Item Type	N	Mean	SD	Score-Point Distribution (%)				
						0	1	2	3	Omit
2006	3516923	ECR_A	3,222	0.64	0.48	32.25	63.84	N/A	N/A	3.91
2006	3595453	ECR_B	3,222	1.09	0.53	26.23	36.84	24.58	7.70	4.66
2007	3516627	BCR_A	31,558	0.52	0.50	41.66	52.17	N/A	N/A	6.17
2007	3595447	BCR_B	31,558	0.83	0.61	22.28	59.64	11.87	N/A	6.21
2006	3516628	BCR_A	3,262	0.22	0.42	74.77	22.23	N/A	N/A	3.00
2006	3595454	BCR_B	3,262	0.65	0.54	49.57	29.28	17.78	N/A	3.37
2007	3516333	BCR_A	31,558	0.60	0.49	37.60	60.47	N/A	N/A	1.93
2007	3595449	BCR_B	31,558	1.22	0.81	21.05	29.56	46.28	N/A	3.11
2007	3517013	BCR_A	31,558	0.35	0.48	61.55	35.38	N/A	N/A	3.07
2007	3595450	BCR_B	31,558	1.13	0.63	10.29	59.17	27.04	N/A	3.50
2007	3516616	BCR_A	31,258	0.40	0.49	55.22	40.43	N/A	N/A	4.34
2007	3595451	BCR_B	31,258	0.98	0.60	14.55	63.53	17.12	N/A	4.80
2007	3516327	BCR_A	31,558	0.44	0.50	52.43	44.43	N/A	N/A	3.14
2007	3595455	BCR_B	31,558	1.19	0.75	16.87	39.74	39.45	N/A	3.94
2008	3516923	ECR_A	30,292	0.78	0.41	20.62	78.05	N/A	N/A	1.33
2008	3595453	ECR_B	30,292	1.54	0.97	12.95	34.55	30.65	19.50	2.35
2008	3516627	BCR_A	30,292	0.54	0.50	39.91	54.38	N/A	N/A	5.71
2008	3595447	BCR_B	30,292	0.92	0.66	19.43	55.77	17.86	N/A	6.94
2008	3516628	BCR_A	30,292	0.24	0.42	75.14	23.53	N/A	N/A	1.33
2008	3595454	BCR_B	30,292	0.85	0.74	34.13	43.11	20.86	N/A	1.90
2008	3516333	BCR_A	30,292	0.64	0.48	33.86	64.22	N/A	N/A	1.92
2008	3595449	BCR_B	30,292	1.22	0.77	17.67	36.74	42.52	N/A	3.08
2008	3517013	BCR_A	30,292	0.57	0.49	40.26	57.29	N/A	N/A	2.45
2008	3595450	BCR_B	30,292	1.43	0.62	4.20	42.79	50.03	N/A	2.98
2008	3516616	BCR_A	30,292	0.41	0.49	52.82	41.03	N/A	N/A	6.15
2008	3595451	BCR_B	30,292	1.00	0.61	11.55	63.02	18.55	N/A	6.88
2008	3516327	BCR_A	30,292	0.44	0.50	54.40	43.67	N/A	N/A	1.92
2008	3595455	BCR_B	30,292	1.23	0.74	16.34	39.59	41.47	N/A	2.60

Table 1.60 Rasch Item and Step Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 6 Form F

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2007	2	3488502	SR	-1.8311			
2006	7	3516923	ECR_A	-0.2947			
2006	8	3595453	ECR_B	1.2607	-1.5377	0.0087	1.5290
2006	12	3516361	SR	0.0635			
2007	13	3492088	SR	-1.4568			
2006	20	3516909	SR	0.4392			
2007	22	3516627	BCR_A	0.4728			
2007	23	3595447	BCR_B	1.2650	-1.8927	1.8927	
2007	24	3488441	SR	0.6901			
2004	27	100000043862	SR	0.0659			
2007	28	3488263	SR	-1.0090			
2007	29	3488500	SR	-1.4601			
2004	30	100000043865	SR	0.4276			
2006	31	3516628	BCR_A	2.0518			
2006	32	3595454	BCR_B	1.3363	-0.4520	0.4520	
2007	47	3516333	BCR_A	0.1031			
2007	48	3595449	BCR_B	0.1124	-0.4274	0.4274	
2006	50	3516929	SR	-0.3587			
2006	54	3516906	SR	0.2547			
2007	58	3488256	SR	0.1076			
2007	59	3517013	BCR_A	1.4674			
2007	60	3595450	BCR_B	0.0865	-1.7954	1.7954	
2006	61	3516375	SR	0.1983			
2007	66	3516616	BCR_A	1.1174			
2007	67	3595451	BCR_B	0.5414	-1.8777	1.8777	
2007	71	3488508	SR	-0.2951			
2007	77	3516327	BCR_A	0.9630			
2007	78	3595455	BCR_B	0.0487	-0.9977	0.9977	
2007	79	3488257	SR	-0.5082			
2008	2	3488502	SR	-2.1067			
2008	7	3516923	ECR_A	-0.6537			
2008	8	3595453	ECR_B	0.8626	-1.8458	0.2499	1.5959
2008	12	3516361	SR	-0.1306			
2008	13	3492088	SR	-1.4997			
2008	20	3516909	SR	0.3274			
2008	22	3516627	BCR_A	0.6439			
2008	23	3595447	BCR_B	1.1168	-1.7979	1.7979	
2008	24	3488441	SR	0.6093			
2008	27	100000043862	SR	0.0847			

Table 1.60 (continued)

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2008	28	3488263	SR	-0.7946			
2008	29	3488500	SR	-1.7078			
2008	30	100000043865	SR	0.8249			
2008	31	3516628	BCR_A	2.5157			
2008	32	3595454	BCR_B	1.3822	-1.0038	1.0038	
2008	47	3516333	BCR_A	0.1568			
2008	48	3595449	BCR_B	0.3681	-0.8854	0.8854	
2008	50	3516929	SR	-0.2890			
2008	54	3516906	SR	0.3667			
2008	58	3488256	SR	0.3246			
2008	59	3517013	BCR_A	0.5063			
2008	60	3595450	BCR_B	-0.7280	-1.6251	1.6251	
2008	61	3516375	SR	0.2299			
2008	66	3516616	BCR_A	1.3552			
2008	67	3595451	BCR_B	0.7537	-2.0793	2.0793	
2008	71	3488508	SR	-0.3522			
2008	77	3516327	BCR_A	1.1725			
2008	78	3595455	BCR_B	0.2939	-0.8570	0.8570	
2008	79	3488257	SR	-0.4530			

Note. Rasch item and step difficulties are on a common scale.

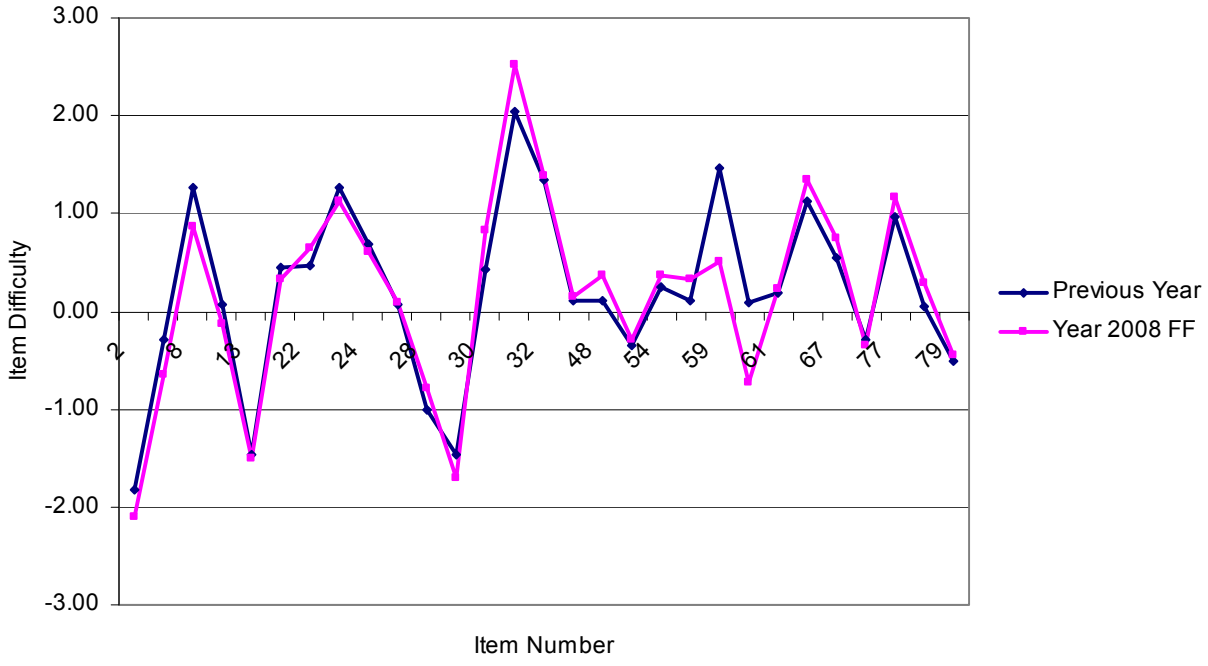


Figure 1.8 Rasch Item Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 6 Form F

Table 1.61 P-Value Comparisons of Core Items for Previous Year vs. Year 2008: Grade 7 Form A

Item CID	Previous Year	Year 08 Form A	Item CID	Previous Year	Year 08 Form A
100000043334	**0.41**	**0.46**	**100000043347**	**0.43**	**0.69**
3595363	**0.49**	**0.58**	**3595366**	**0.22**	**0.30**
3487667	0.26	0.25	**3517876**	**0.14**	**0.14**
3517863	0.61	0.63	**100000043353**	**0.44**	**0.63**
100000043348	**0.23**	**0.38**	100000043338	0.23	0.34
3595364	**0.16**	**0.26**	**3517673**	**0.65**	**0.67**
100000043345	**0.20**	**0.35**	**3564020**	**0.40**	**0.44**
3547779	**0.60**	**0.55**	**3487649**	**0.20**	**0.22**
3517645	**0.69**	**0.71**	**3517654**	**0.48**	**0.53**
100000043351	**0.47**	**0.70**	**100000043343**	**0.39**	**0.51**
3517646	**0.69**	**0.70**	**3517878**	**0.31**	**0.39**
3595365	**0.67**	**0.70**	**3595367**	**0.42**	**0.52**
3547642	**0.70**	**0.70**	3517691	0.62	0.61
3487560	**0.27**	**0.28**	**3492156**	**0.30**	**0.35**
3517725	**0.26**	**0.30**	3488830	0.45	0.58
3564022	**0.40**	**0.45**			

Note. Bold-faced number indicates a BCR or ECR item.

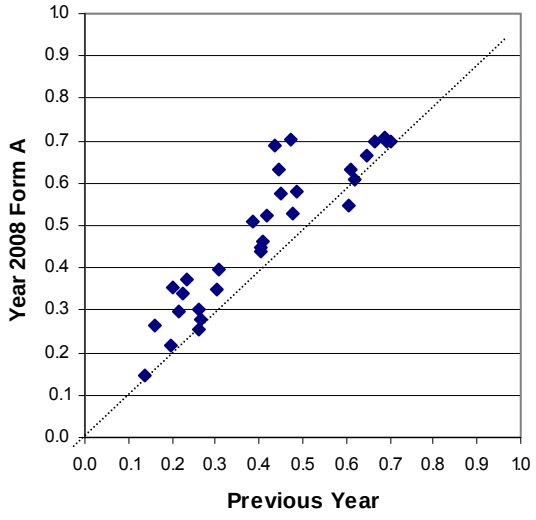


Table 1.62 Score-Point Distribution Comparisons of Constructed Response Core Items for Previous Year vs. Year 2008: Grade 7 Form A

Year	Item CID	Item Type	N	Mean	SD	Score-Point Distribution (%)				
						0	1	2	3	Omit
2004	100000043334	BCR_A	11,522	0.41	0.49	45.83	40.74	N/A	N/A	13.43
2004	3595363	BCR_B	11,522	0.97	0.81	19.17	34.46	31.42	N/A	14.95
2004	100000043348	ECR_A	11,667	0.23	0.42	53.88	23.32	N/A	N/A	22.80
2004	3595364	ECR_B	11,667	0.48	0.83	40.76	18.01	7.90	4.75	28.58
2006	3517646	BCR_A	39,533	0.69	0.46	26.37	69.30	N/A	N/A	4.33
2006	3595365	BCR_B	39,533	1.33	0.56	15.67	25.53	53.93	N/A	4.87
2007	3517725	BCR_A	32,264	0.26	0.44	69.73	26.31	N/A	N/A	3.96
2007	3564022	BCR_B	32,264	0.81	0.80	38.54	31.61	24.57	N/A	5.28
2004	100000043347	ECR_A	11,522	0.43	0.50	47.12	43.40	N/A	N/A	9.49
2004	3595366	ECR_B	11,522	0.65	0.65	33.27	44.84	9.82	0.02	12.06
2007	3517673	ECR_A	32,264	0.65	0.48	31.06	64.74	N/A	N/A	4.20
2007	3564020	ECR_B	32,264	1.21	0.60	3.39	66.72	23.79	2.30	3.80
2006	3517878	BCR_A	3,382	0.31	0.46	61.00	30.81	N/A	N/A	8.19
2006	3595367	BCR_B	3,382	0.84	0.52	28.92	44.23	19.72	N/A	7.13
2008	100000043334	BCR_A	31,804	0.46	0.50	47.50	46.14	N/A	N/A	6.36
2008	3595363	BCR_B	31,804	1.16	0.82	19.66	30.65	42.56	N/A	7.12
2008	100000043348	ECR_A	31,804	0.38	0.48	55.55	37.50	N/A	N/A	6.95
2008	3595364	ECR_B	31,804	0.79	0.97	40.42	27.36	13.19	8.52	10.51
2008	3517646	BCR_A	31,804	0.70	0.46	20.75	69.96	N/A	N/A	9.29
2008	3595365	BCR_B	31,804	1.40	0.84	12.37	13.85	62.98	N/A	10.80
2008	3517725	BCR_A	31,804	0.30	0.46	66.31	30.25	N/A	N/A	3.44
2008	3564022	BCR_B	31,804	0.89	0.84	36.49	28.55	30.46	N/A	4.50
2008	100000043347	ECR_A	31,804	0.69	0.46	27.92	69.10	N/A	N/A	2.99
2008	3595366	ECR_B	31,804	0.89	0.55	15.77	69.82	9.23	0.35	4.82
2008	3517673	ECR_A	31,804	0.67	0.47	30.66	66.66	N/A	N/A	2.68
2008	3564020	ECR_B	31,804	1.32	0.64	2.53	62.97	27.49	4.78	2.22
2008	3517878	BCR_A	31,804	0.39	0.49	56.63	39.41	N/A	N/A	3.96
2008	3595367	BCR_B	31,804	1.04	0.72	18.74	47.86	28.28	N/A	5.12

Table 1.63 Rasch Item and Step Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 7 Form A

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2004	5	100000043334	BCR_A	0.1146			
2004	6	3595363	BCR_B	-0.4087	-0.8011	0.8011	
2007	11	3487667	SR	1.6316			
2006	17	3517863	SR	-0.4238			
2004	21	100000043348	ECR_A	1.1693			
2004	22	3595364	ECR_B	1.6364	-0.8377	0.1101	0.7277
2004	23	100000043345	SPR	1.3162			
2007	24	3547779	SPR	-0.3069			
2007	25	3517645	SPR	-1.1974			
2004	26	100000043351	SPR	-0.2036			
2006	28	3517646	BCR_A	-1.0705			
2006	29	3595365	BCR_B	-0.8516	-0.3784	0.3784	
2007	38	3547642	SPR	-1.0604			
2007	39	3487560	SPR	1.5135			
2007	40	3517725	BCR_A	1.6208			
2007	41	3564022	BCR_B	0.6682	-0.6977	0.6977	
2004	45	100000043347	ECR_A	0.0200			
2004	46	3595366	ECR_B	3.4100	-4.0297	-1.0782	5.1079
2007	47	3517876	SPR	2.7529			
2005	48	100000043353	SPR	0.2680			
2004	50	100000043338	SR	1.3356			
2007	53	3517673	ECR_A	-0.8144			
2007	54	3564020	ECRB	0.8436	-4.4403	0.7733	3.667
2007	55	3487649	SPR	2.1304			
2006	56	3517654	SPR	0.2314			
2004	57	100000043343	SPR	0.3333			
2006	67	3517878	BCR_A	1.2445			
2006	68	3595367	BCR_B	0.6133	-1.1739	1.1739	
2006	70	3517691	SR	-0.4573			
2007	78	3492156	SPR	1.2034			
2007	81	3488830	SR	0.3784			
2008	5	100000043334	BCR_A	0.5824			
2008	6	3595363	BCR_B	-0.1895	-0.6819	0.6819	
2008	11	3487667	SR	2.0203			
2008	17	3517863	SR	-0.4038			
2008	21	100000043348	ECR_A	0.9563			
2008	22	3595364	ECR_B	1.5655	-1.0967	0.3318	0.7649
2008	23	100000043345	SPR	1.1777			
2008	24	3547779	SPR	0.0174			
2008	25	3517645	SPR	-1.0518			
2008	26	100000043351	SPR	-1.1112			

Table 1.63 (continued)

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2008	28	3517646	BCR_A	-1.0888			
2008	29	3595365	BCR_B	-0.9755	0.1389	-0.1389	
2008	38	3547642	SPR	-0.9166			
2008	39	3487560	SPR	1.7398			
2008	40	3517725	BCR_A	1.5045			
2008	41	3564022	BCR_B	0.5585	-0.4548	0.4548	
2008	45	100000043347	ECR_A	-0.8969			
2008	46	3595366	ECR_B	2.6970	-4.3825	0.7102	3.6723
2008	47	3517876	SPR	2.8645			
2008	48	100000043353	SPR	-0.4017			
2008	50	100000043338	SR	1.4392			
2008	53	3517673	ECR_A	-0.6673			
2008	54	3564020	ECR_B	0.2954	-4.5319	1.1166	3.4153
2008	55	3487649	SPR	2.2096			
2008	56	3517654	SPR	0.1125			
2008	57	100000043343	SPR	0.2698			
2008	67	3517878	BCR_A	0.8699			
2008	68	3595367	BCR_B	0.1013	-1.4432	1.4432	
2008	70	3517691	SR	-0.2784			
2008	78	3492156	SPR	1.2944			
2008	81	3488830	SR	-0.0385			

Note. Rasch item and step difficulties are on a common scale.

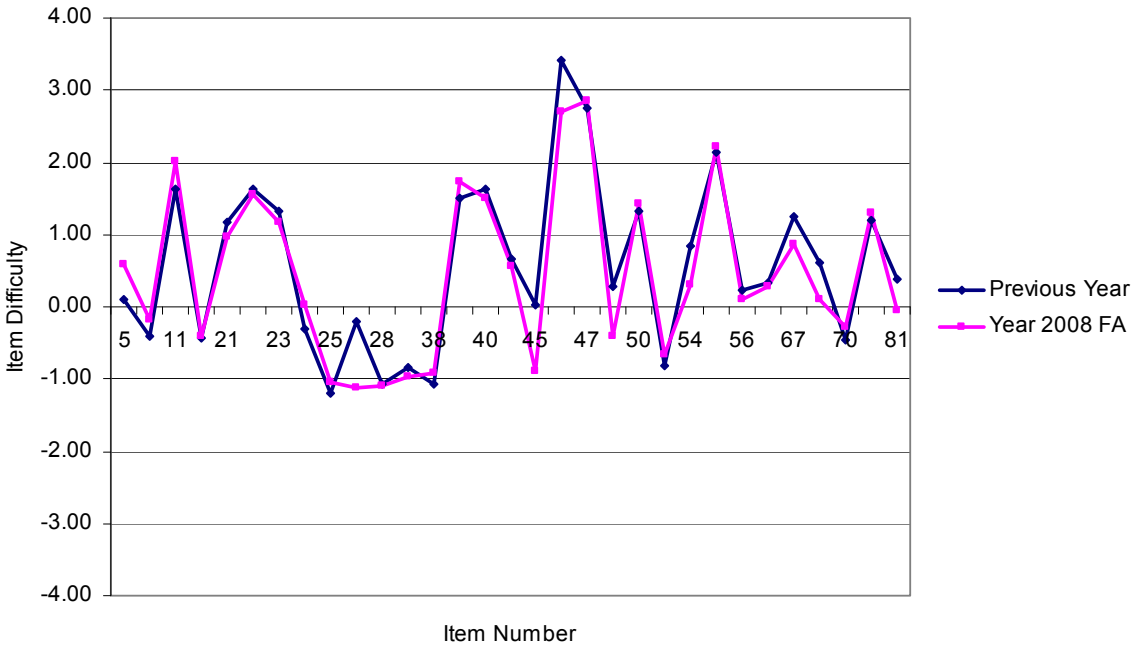


Figure 1.9 Rasch Item Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 7 Form A

Table 1.64 P-Value Comparisons of Core Items for Previous Year vs. Year 2008: Grade 7 Form F

Item CID	Previous Year	Year 08 Form F	Item CID	Previous Year	Year 08 Form F
100000043335	**0.55**	**0.68**	**3547487**	**0.66**	**0.81**
3595368	**0.64**	**0.80**	**3564031**	**0.23**	**0.33**
100000043349	0.29	0.36	**100000043354**	**0.19**	**0.40**
3517739	0.81	0.85	**100000043356**	**0.47**	**0.78**
3487765	**0.37**	**0.42**	100000043338	0.23	0.33
3595369	**0.49**	**0.50**	**3517648**	**0.63**	**0.67**
100000043344	**0.32**	**0.36**	**3564027**	**0.58**	**0.64**
3513631	**0.56**	**0.55**	**3492169**	**0.34**	**0.38**
3487596	**0.27**	**0.37**	**100000043342**	**0.41**	**0.67**
100000043350	**0.39**	**0.57**	**3492165**	**0.44**	**0.47**
3517610	**0.53**	**0.47**	3487747	0.26	**0.23**
3595370	**0.59**	**0.51**	**3517708**	**0.46**	**0.54**
3513630	**0.66**	**0.68**	**3595372**	**0.64**	**0.75**
100000043360	**0.35**	**0.55**	3517691	0.62	0.64
100000048821	**0.46**	**0.64**	3487615	0.62	0.58
3595371	**0.25**	**0.37**	**3487734**	**0.39**	**0.44**
3491634	0.32	0.29	3487898	0.52	0.51

Note. Bold-faced number indicates a BCR or ECR item.

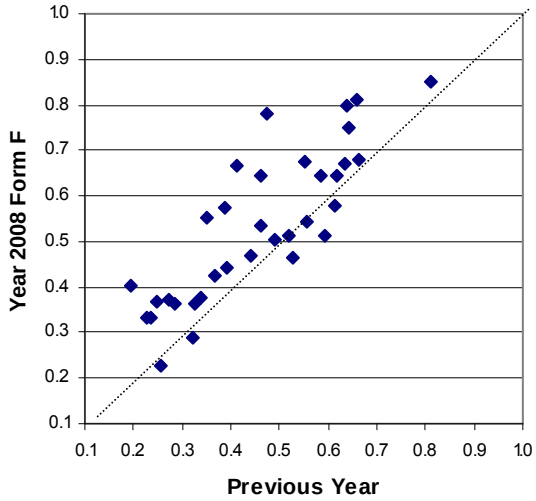


Table 1.65 Score-Point Distribution Comparisons of Constructed Response Core Items for Previous Year vs. Year 2008: Grade 7 Form F

Year	Item CID	Item Type	N	Mean	SD	Score-Point Distribution (%)				
						0	1	2	3	Omit
2004	100000043335	BCR_A	11,667	0.55	0.50	40.45	55.30	N/A	N/A	4.25
2004	3595368	BCR_B	11,667	1.28	0.87	22.01	16.18	55.90	N/A	5.91
2007	3487765	ECR_A	2,174	0.37	0.48	61.68	36.66	N/A	N/A	1.66
2007	3595369	ECR_B	2,174	1.47	0.83	11.32	27.92	49.95	6.30	4.51
2006	3517610	BCR_A	26,296	0.53	0.50	41.23	52.59	N/A	N/A	6.18
2006	3595370	BCR_B	26,296	1.18	0.60	21.22	25.73	46.34	N/A	6.71
2005	100000048821	BCR_A	13,390	0.46	0.50	46.37	46.10	N/A	N/A	7.53
2005	3595371	BCR_B	13,390	0.49	0.36	40.75	48.72	0.25	N/A	10.28
2005	3547487	ECR_A	13,123	0.66	0.47	26.34	65.77	N/A	N/A	7.89
2005	3564031	ECR_B	13,123	0.70	0.33	26.59	59.00	5.49	0.14	8.78
2007	3517648	ECR_A	32,000	0.63	0.48	33.25	63.38	N/A	N/A	3.37
2007	3564027	ECR_B	32,000	1.75	0.91	10.73	11.83	55.75	17.37	4.32
2006	3517708	BCR_A	39,533	0.46	0.50	42.03	46.00	N/A	N/A	11.97
2006	3595372	BCR_B	39,533	1.28	0.55	8.46	30.49	48.83	N/A	12.23
2008	100000043335	BCR_A	31,048	0.68	0.47	31.33	67.52	N/A	N/A	1.15
2008	3595368	BCR_B	31,048	1.60	0.68	9.17	18.32	70.69	N/A	1.81
2008	3487765	ECR_A	31,048	0.42	0.49	54.91	42.35	N/A	N/A	2.75
2008	3595369	ECR_B	31,048	1.51	0.80	8.29	29.32	50.91	6.52	4.96
2008	3517610	BCR_A	31,048	0.47	0.50	42.44	46.52	N/A	N/A	11.05
2008	3595370	BCR_B	31,048	1.03	0.82	19.49	32.13	35.38	N/A	13.01
2008	100000048821	BCR_A	31,048	0.64	0.48	32.78	64.45	N/A	N/A	2.78
2008	3595371	BCR_B	31,048	0.73	0.52	25.16	66.09	3.70	N/A	5.05
2008	3547487	ECR_A	31,048	0.81	0.39	15.98	81.16	N/A	N/A	2.86
2008	3564031	ECR_B	31,048	0.99	0.59	12.72	66.68	15.44	0.61	4.55
2008	3517648	ECR_A	31,048	0.67	0.47	31.60	66.88	N/A	N/A	1.52
2008	3564027	ECR_B	31,048	1.93	0.85	8.05	9.71	57.19	22.85	2.19
2008	3517708	BCR_A	31,048	0.54	0.50	40.50	53.54	N/A	N/A	5.97
2008	3595372	BCR_B	31,048	1.50	0.71	6.96	23.67	63.34	N/A	6.03

Table 1.66 Rasch Item and Step Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 7 Form F

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2004	5	100000043335	BCR_A	-0.5514			
2004	6	3595368	BCR_B	-0.9471	0.3475	-0.3475	
2004	11	100000043349	SR	1.0088			
2006	17	3517739	SR	-1.7201			
2007	21	3487765	ECR_A	0.8991			
2007	22	3595369	ECR_B	0.3951	-2.2571	-0.9019	3.1591
2004	23	100000043344	SPR	0.5443			
2007	24	3513631	SPR	-0.0385			
2007	25	3487596	SPR	1.4391			
2004	26	100000043350	SPR	0.3584			
2006	28	3517610	BCR_A	-0.0757			
2006	29	3595370	BCR_B	-0.4436	-0.3197	0.3197	
2007	38	3513630	SPR	-0.7477			
2004	39	100000043360	SPR	0.4777			
2005	40	100000048821	BCR_A	0.0541			
2005	41	3595371	BCR_B	3.2743	-3.4653	3.4653	
2007	44	3491634	SR	1.3329			
2005	45	3547487	ECR_A	-1.0830			
2005	46	3564031	ECR_B	2.8049	-3.8213	0.685	3.1363
2004	47	100000043354	SPR	1.4061			
2004	48	100000043356	SPR	-0.4084			
2004	50	100000043338	SR	1.3356			
2007	53	3517648	ECR_A	-0.6275			
2007	54	3564027	ECR_B	-0.3188	-0.9499	-1.4821	2.432
2007	55	3492169	SPR	1.1052			
2004	56	100000043342	SPR	0.1876			
2007	57	3492165	SPR	0.4581			
2007	63	3487747	SR	1.7313			
2006	67	3517708	BCR_A	0.2039			
2006	68	3595372	BCR_B	-1.0212	-0.8667	0.8667	
2006	70	3517691	SR	-0.4573			
2007	72	3487615	SR	-0.3572			
2007	78	3487734	SPR	0.6953			
2007	81	3487898	SR	0.1081			
2008	5	100000043335	BCR_A	-0.4860			
2008	6	3595368	BCR_B	-1.3132	-0.2339	0.2339	
2008	11	100000043349	SR	1.3415			
2008	17	3517739	SR	-1.9183			
2008	21	3487765	ECR_A	0.8535			
2008	22	3595369	ECR_B	0.5148	-2.3799	-0.9260	3.3059
2008	23	100000043344	SPR	1.2419			
2008	24	3513631	SPR	0.1934			
2008	25	3487596	SPR	1.0476			
2008	26	100000043350	SPR	-0.0987			

Table 1.66 (continued)

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2008	28	3517610	BCR_A	0.4313			
2008	29	3595370	BCR_B	0.0359	-0.7781	0.7781	
2008	38	3513630	SPR	-0.5989			
2008	39	100000043360	SPR	0.1275			
2008	40	100000048821	BCR_A	-0.4202			
2008	41	3595371	BCR_B	1.8783	-2.7673	2.7673	
2008	44	3491634	SR	1.7720			
2008	45	3547487	ECR_A	-1.7311			
2008	46	3564031	ECR_B	2.1381	-4.0409	0.4064	3.6345
2008	47	100000043354	SPR	1.0066			
2008	48	100000043356	SPR	-1.3785			
2008	50	100000043338	SR	1.4309			
2008	53	3517648	ECR_A	-0.5360			
2008	54	3564027	ECR_B	-0.3195	-0.8801	-1.5639	2.4440
2008	55	3492169	SPR	1.1079			
2008	56	100000043342	SPR	-0.5518			
2008	57	3492165	SPR	0.5345			
2008	63	3487747	SR	2.1330			
2008	67	3517708	BCR_A	0.1843			
2008	68	3595372	BCR_B	-1.3958	-0.7581	0.7581	
2008	70	3517691	SR	-0.4072			
2008	72	3487615	SR	0.0253			
2008	78	3487734	SPR	0.7117			
2008	81	3487898	SR	0.3744			

Note. Rasch item and step difficulties are on a common scale.

Figure 1.10 Rasch Item Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 7 Form F

Table 1.67 P-Value Comparisons of Core Items for Previous Year vs. Year 2008: Grade 8 Form A

Item CID	Previous Year	Year 08 Form A	Item CID	Previous Year	Year 08 Form A
3514013	**0.44**	**0.47**	**3514607**	**0.26**	**0.27**
3564107	**0.64**	**0.65**	**3564112**	**0.24**	**0.28**
3500150	0.49	0.47	**3514118**	**0.09**	**0.10**
100000043330	0.38	0.45	**3564113**	**0.40**	**0.35**
100000043305	0.62	0.64	3487539	0.64	0.63
3514702	**0.28**	**0.33**	100000043311	0.40	0.36
3564108	**0.34**	**0.40**	3487525	0.47	0.50
3513650	**0.30**	**0.32**	3487540	0.60	0.65
3514064	**0.14**	**0.22**	**100000043313**	**0.41**	**0.59**
3500166	**0.34**	**0.34**	**000003595405**	**0.41**	**0.70**
100000043325	**0.39**	**0.57**	**3513638**	**0.34**	**0.36**
3514595	0.65	0.68	**3487542**	**0.45**	**0.49**
3514267	**0.35**	**0.39**	3514136	0.61	0.66
3564110	**0.62**	**0.66**	3487568	0.23	0.19
3514263	**0.51**	**0.58**	100000043304	0.28	0.28
3487907	**0.36**	**0.45**	**3500162**	**0.29**	**0.24**
100000043320	0.49	0.47	**3514079**	**0.31**	**0.29**
3514117	**0.32**	**0.37**	**3514669**	**0.51**	**0.55**
3564111	**0.39**	**0.40**	**3564114**	**0.63**	**0.71**
3492059	**0.44**	**0.44**	3487912	0.52	0.53
3487708	**0.67**	**0.69**			

Note. Bold-faced number indicates a BCR or ECR item.

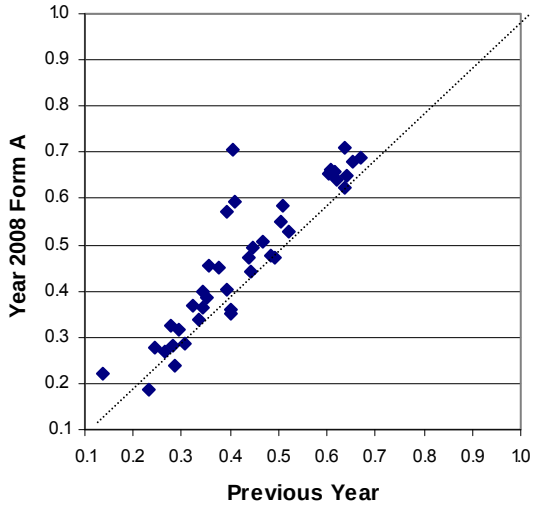


Table 1.68 Score-Point Distribution Comparisons of Constructed Response Core Items for Previous Year vs. Year 2008: Grade 8 Form A

Year	Item CID	Item Type	N	Mean	SD	Score-Point Distribution (%)				
						0	1	2	3	Omit
2007	3514013	BCR_A	32,836	0.44	0.50	52.34	43.85	N/A	N/A	3.81
2007	3564107	BCR_B	32,836	1.28	0.69	8.61	44.62	41.81	N/A	4.95
2007	3514702	ECR_A	32,836	0.28	0.45	65.83	27.65	N/A	N/A	6.51
2007	3564108	ECR_B	32,836	1.03	1.13	34.62	26.39	11.53	17.81	9.66
2007	3514267	BCR_A	32,836	0.35	0.48	61.06	34.98	N/A	N/A	3.96
2007	3564110	BCR_B	32,836	1.23	0.67	8.73	49.35	36.87	N/A	5.05
2007	3514117	BCR_A	32,836	0.32	0.47	57.53	32.11	N/A	N/A	10.36
2007	3564111	BCR_B	32,836	0.79	0.78	30.13	34.58	21.97	N/A	13.31
2007	3514607	ECR_A	32,836	0.26	0.44	64.57	26.32	N/A	N/A	9.12
2007	3564112	ECR_B	32,836	0.73	1.05	49.17	12.90	15.01	10.02	12.89
2007	3514118	BCR_A	32,836	0.09	0.29	86.62	9.37	N/A	N/A	4.00
2007	3564113	BCR_B	32,836	0.80	0.49	18.42	72.25	3.99	N/A	5.34
2004	100000043313	ECR_A	12,814	0.41	0.49	54.68	40.92	N/A	N/A	4.39
2004	3595405	ECR_B	12,814	1.22	1.24	39.17	14.88	16.93	24.55	4.47
2007	3514669	BCR_A	32,836	0.51	0.50	41.96	50.51	N/A	N/A	7.53
2007	3564114	BCR_B	32,836	1.27	0.81	14.37	26.39	50.27	N/A	8.97
2008	3514013	BCR_A	32,318	0.47	0.50	50.68	47.01	N/A	N/A	2.31
2008	3564107	BCR_B	32,318	1.30	0.69	9.99	43.80	43.23	N/A	2.99
2008	3514702	ECR_A	32,318	0.33	0.47	63.84	32.64	N/A	N/A	3.53
2008	3564108	ECR_B	32,318	1.19	1.16	31.56	29.23	11.81	22.18	5.22
2008	3514267	BCR_A	32,318	0.39	0.49	58.52	38.52	N/A	N/A	2.95
2008	3564110	BCR_B	32,318	1.31	0.69	9.29	42.85	44.24	N/A	3.61
2008	3514117	BCR_A	32,318	0.37	0.48	55.99	36.99	N/A	N/A	7.02
2008	3564111	BCR_B	32,318	0.81	0.79	33.68	34.31	23.22	N/A	8.79
2008	3514607	ECR_A	32,318	0.27	0.44	64.36	26.92	N/A	N/A	8.72
2008	3564112	ECR_B	32,318	0.83	1.09	45.22	13.36	17.36	11.71	12.35
2008	3514118	BCR_A	32,318	0.10	0.30	85.89	10.08	N/A	N/A	4.02
2008	3564113	BCR_B	32,318	0.71	0.54	28.88	62.68	3.92	N/A	4.52
2008	100000043313	ECR_A	32,318	0.59	0.49	37.84	59.42	N/A	N/A	2.74
2008	3595405	ECR_B	32,318	2.11	1.04	6.88	17.26	22.06	49.94	3.86
2008	3514669	BCR_A	32,318	0.55	0.50	39.26	55.18	N/A	N/A	5.56
2008	3564114	BCR_B	32,318	1.42	0.76	10.25	23.93	59.06	N/A	6.75

Table 1.69 Rasch Item and Step Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 8 Form A

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2007	3	3514013	BCR_A	0.3616			
2007	4	3564107	BCR_B	-1.1070	-1.441	1.441	
2007	6	3500150	SR	0.1886			
2004	8	100000043330	SR	0.3962			
2005	14	100000043305	SR	-0.8459			
2007	15	3514702	ECR_A	1.2761			
2007	16	3564108	ECR_B	0.6901	-0.7491	0.5272	0.2219
2007	17	3513650	SPR	1.1558			
2007	18	3514064	SPR	2.7466			
2007	19	3500166	SPR	0.8807			
2004	20	100000043325	SPR	0.1969			
2006	21	3514595	SR	-0.8658			
2007	23	3514267	BCR_A	0.8169			
2007	24	3564110	BCR_B	-0.9309	-1.4936	1.4936	
2007	25	3514263	SPR	-0.1362			
2007	26	3487907	SPR	0.7793			
2005	31	100000043320	SR	-0.1139			
2007	34	3514117	BCR_A	0.9736			
2007	35	3564111	BCR_B	0.4284	-0.8203	0.8203	
2007	36	3492059	SPR	0.2971			
2007	37	3487708	SPR	-1.0544			
2007	39	3514607	ECR_A	1.2953			
2007	40	3564112	ECR_B	1.2629	0.1082	-0.8532	0.745
2007	44	3514118	BCR_A	2.8471			
2007	45	3564113	BCR_B	1.0451	-2.7281	2.7281	
2007	48	3487539	SR	-0.7390			
2004	49	100000043311	SR	0.2180			
2007	50	3487525	SR	0.0654			
2007	51	3487540	SR	-0.5923			
2004	54	100000043313	ECR_A	0.1847			
2004	55	3595405	ECR_B	0.1002	0.1515	-0.3165	0.165
2007	56	3513638	SPR	0.8689			
2007	57	3487542	SPR	0.2362			
2006	59	3514136	SR	-0.6909			
2007	65	3487568	SR	1.3814			
2005	68	100000043304	SR	1.0478			
2007	74	3500162	SPR	1.2222			
2007	75	3514079	SPR	1.2068			
2007	76	3514669	BCR_A	-0.1522			
2007	77	3564114	BCR_B	-0.8897	-0.4608	0.4608	
2007	78	3487912	SR	-0.1038			
2008	3	3514013	BCR_A	0.2481			
2008	4	3564107	BCR_B	-0.9490	-1.2905	1.2905	
2008	6	3500150	SR	0.3158			

Table 1.69 (continued)

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2008	8	100000043330	SR	0.3621			
2008	14	100000043305	SR	-0.7079			
2008	15	3514702	ECR_A	1.0904			
2008	16	3564108	ECR_B	0.5369	-0.8401	0.6976	0.1425
2008	17	3513650	SPR	1.1148			
2008	18	3514064	SPR	1.6566			
2008	19	3500166	SPR	0.9813			
2008	20	100000043325	SPR	-0.4508			
2008	21	3514595	SR	-0.854			
2008	23	3514267	BCR_A	0.6788			
2008	24	3564110	BCR_B	-0.9812	-1.2635	1.2635	
2008	25	3514263	SPR	-0.3795			
2008	26	3487907	SPR	0.3647			
2008	31	100000043320	SR	0.2581			
2008	34	3514117	BCR_A	0.7094	-0.7657	0.7657	
2008	35	3564111	BCR_B	0.5525			
2008	36	3492059	SPR	0.3553			
2008	37	3487708	SPR	-1.0683			
2008	39	3514607	ECR_A	1.3428			
2008	40	3564112	ECR_B	1.1814	0.0189	-0.8420	0.8231
2008	44	3514118	BCR_A	2.969			
2008	45	3564113	BCR_B	1.6151	-2.4991	2.4991	
2008	48	3487539	SR	-0.6178			
2008	49	100000043311	SR	0.8435			
2008	50	3487525	SR	0.0551			
2008	51	3487540	SR	-0.7102			
2008	54	100000043313	ECR_A	-0.5034			
2008	55	3595405	ECR_B	-1.1346	-.08613	0.1993	0.6621
2008	56	3513638	SPR	0.8139			
2008	57	3487542	SPR	0.0986			
2008	59	3514136	SR	-0.891			
2008	65	3487568	SR	2.0087			
2008	68	100000043304	SR	1.3321			
2008	74	3500162	SPR	1.5218			
2008	75	3514079	SPR	1.2839			
2008	76	3514669	BCR_A	-0.255			
2008	77	3564114	BCR_B	-1.2583	-0.4250	0.4250	
2008	78	3487912	SR	-0.0934			

Note. Rasch item and step difficulties are on a common scale.

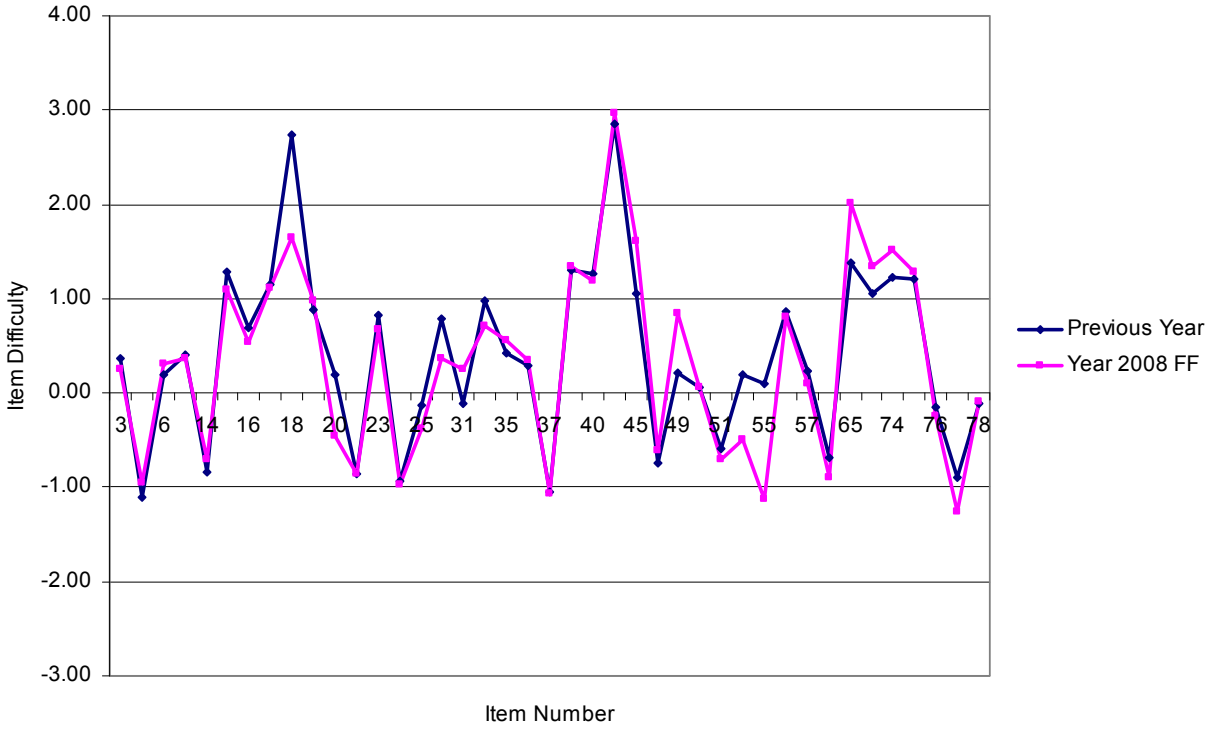


Figure 1.11 Rasch Item Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 8 Form A

Table 1.70 P-Value Comparisons of Core Items for Previous Year vs. Year 2008: Grade 8 Form F

Item CID	Previous Year	Year 08 Form F	Item CID	Previous Year	Year 08 Form F
3514013	**0.44**	**0.49**	**3519804**	**0.23**	**0.27**
3564107	**0.64**	**0.66**	**3514607**	**0.26**	**0.27**
3487526	0.56	0.60	**3564112**	**0.24**	**0.28**
100000043330	0.38	0.47	**3514266**	**0.29**	**0.33**
100000043305	0.62	0.64	**3564120**	**0.49**	**0.50**
3514283	**0.34**	**0.40**	3487539	0.64	0.63
3564116	**0.49**	**0.55**	3487901	0.82	0.85
3492049	**0.58**	**0.59**	3487540	0.60	0.65
100000043307	**0.27**	**0.28**	**100000043313**	**0.41**	**0.61**
3514162	**0.37**	**0.42**	**3595405**	**0.41**	**0.71**
3487563	**0.40**	**0.46**	**3487913**	**0.34**	**0.36**
3514595	0.65	0.71	**3514167**	**0.52**	**0.55**
3514217	**0.23**	**0.27**	3514136	0.61	0.69
3595406	**0.38**	**0.44**	3492047	0.27	0.34
3513648	**0.58**	**0.57**	100000043304	0.28	0.29
100000043314	**0.35**	**0.29**	**3487721**	**0.47**	**0.50**
3500154	0.66	0.73	**3492052**	**0.24**	**0.24**
3514117	**0.32**	**0.37**	**3514709**	**0.48**	**0.51**
3564111	**0.39**	**0.43**	**3595408**	**0.61**	**0.73**
3514114	**0.41**	**0.41**	3487672	0.40	0.39

Note. Bold-faced number indicates a BCR or ECR item.

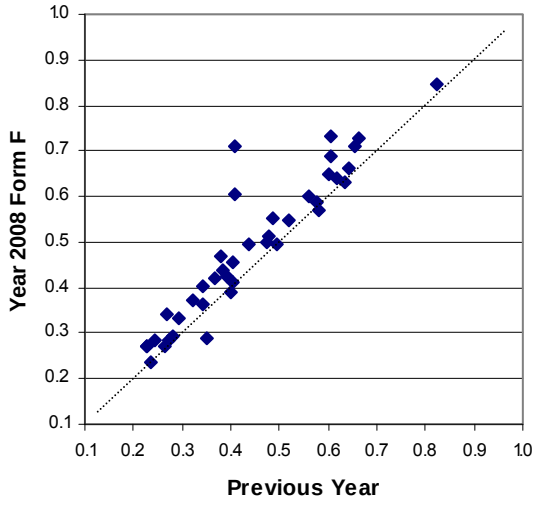


Table 1.71 Score-Point Distribution Comparisons of Constructed Response Core Items for Previous Year vs. Year 2008: Grade 8 Form F

Year	Item CID	Item Type	N	Mean	SD	Score-Point Distribution (%)				
						0	1	2	3	Omit
2007	3514013	BCR_A	32,836	0.44	0.50	52.34	43.85	N/A	N/A	3.81
2007	3564107	BCR_B	32,836	1.28	0.69	8.61	44.62	41.81	N/A	4.95
2007	3514283	ECR_A	32,480	0.34	0.48	59.90	34.44	N/A	N/A	5.66
2007	3564116	ECR_B	32,480	1.46	1.00	7.40	46.89	15.97	22.24	7.52
2006	3514217	BCR_A	27,033	0.23	0.42	69.06	22.59	N/A	N/A	8.35
2006	3595406	BCR_B	27,033	0.76	0.35	20.82	70.44	2.98	N/A	5.76
2007	3514117	BCR_A	32,836	0.32	0.47	57.53	32.11	N/A	N/A	10.36
2007	3564111	BCR_B	32,836	0.79	0.78	30.13	34.58	21.97	N/A	13.31
2007	3514607	ECR_A	32,836	0.26	0.44	64.57	26.32	N/A	N/A	9.12
2007	3564112	ECR_B	32,836	0.73	1.05	49.17	12.90	15.01	10.02	12.89
2007	3514266	BCR_A	32,480	0.29	0.46	65.02	29.33	N/A	N/A	5.66
2007	3564120	BCR_B	32,480	0.99	0.72	18.94	47.63	25.58	N/A	7.85
2004	100000043313	ECR_A	12,814	0.41	0.49	54.68	40.92	N/A	N/A	4.39
2004	3595405	ECR_B	12,814	1.22	1.24	39.17	14.88	16.93	24.55	4.47
2006	3514709	BCR_A	3,524	0.48	0.50	43.59	47.90	N/A	N/A	8.51
2006	3595408	BCR_B	3,524	1.21	0.57	15.66	29.80	45.72	N/A	8.83
2008	3514013	BCR_A	31,743	0.49	0.50	48.17	49.33	N/A	N/A	2.50
2008	3564107	BCR_B	31,743	1.33	0.68	8.79	42.53	45.03	N/A	3.65
2008	3514283	ECR_A	31,743	0.40	0.49	57.00	40.29	N/A	N/A	2.71
2008	3564116	ECR_B	31,743	1.66	0.98	4.88	44.63	18.27	28.15	4.07
2008	3514217	BCR_A	31,743	0.27	0.45	69.32	27.26	N/A	N/A	3.42
2008	3595406	BCR_B	31,743	0.88	0.46	12.33	77.51	5.13	N/A	5.04
2008	3514117	BCR_A	31,743	0.37	0.48	55.13	37.26	N/A	N/A	7.61
2008	3564111	BCR_B	31,743	0.85	0.79	29.01	35.61	24.73	N/A	10.65
2008	3514607	ECR_A	31,743	0.27	0.44	63.81	27.07	N/A	N/A	9.13
2008	3564112	ECR_B	31,743	0.85	1.09	43.12	14.36	17.20	11.97	13.35
2008	3514266	BCR_A	31,743	0.33	0.47	60.28	33.36	N/A	N/A	6.36
2008	3564120	BCR_B	31,743	0.99	0.73	18.71	46.43	26.39	N/A	8.47
2008	100000043313	ECR_A	31,743	0.61	0.49	36.74	60.54	N/A	N/A	2.72
2008	3595405	ECR_B	31,743	2.13	1.02	5.65	18.15	22.85	49.58	3.77
2008	3514709	BCR_A	31,743	0.51	0.50	44.72	51.12	N/A	N/A	4.16
2008	3595408	BCR_B	31,743	1.46	0.71	7.94	28.05	59.09	N/A	4.93

Table 1.72 Rasch Item and Step Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 8 Form F

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2007	3	3514013	BCR_A	0.3616			
2007	4	3564107	BCR_B	-1.1070	-1.441	1.441	
2007	6	3487526	SR	-0.248			
2004	8	100000043330	SR	0.3962			
2005	14	100000043305	SR	-0.8459			
2007	15	3514283	ECR_A	0.8146			
2007	16	3564116	ECR_B	-0.2444	-2.2962	1.2817	1.0145
2007	17	3492049	SPR	-0.475			
2004	18	100000043307	SPR	0.8978			
2007	19	3514162	SPR	0.6672			
2007	20	3487563	SPR	0.3705			
2006	21	3514595	SR	-0.8658			
2006	23	3514217	BCR_A	1.5404			
2006	24	3595406	BCR_B	1.3259	-2.8804	2.8804	
2007	25	3513648	SPR	-0.4536			
2004	26	100000043314	SPR	0.4873			
2007	31	3500154	SR	-0.9169			
2007	34	3514117	BCR_A	0.9736			
2007	35	3564111	BCR_B	0.4284	-0.8203	0.8203	
2007	36	3514114	SPR	0.4361			
2007	37	3519804	SPR	1.6473			
2007	39	3514607	ECR_A	1.2953			
2007	40	3564112	ECR_B	1.2629	0.1082	-0.8532	0.745
2007	44	3514266	BCR_A	1.2135			
2007	45	3564120	BCR_B	-0.0476	-1.3415	1.3415	
2007	48	3487539	SR	-0.739			
2007	49	3487901	SR	-1.9759			
2007	51	3487540	SR	-0.5923			
2004	54	100000043313	ECR_A	0.1847			
2004	55	3595405	ECR_B	0.1002	0.1515	-0.3165	0.165
2007	56	3487913	SPR	0.8646			
2006	57	3514167	SPR	-0.3444			
2006	59	3514136	SR	-0.6909			
2007	66	3492047	SR	1.2678			
2005	68	100000043304	SR	1.0478			
2007	74	3487721	SPR	0.0882			
2007	75	3492052	SPR	1.4609			
2006	76	3514709	BCR_A	-0.0807			
2006	77	3595408	BCR_B	-0.7861	-0.5116	0.5116	
2007	78	3487672	SR	0.5495			
2008	3	3514013	BCR_A	0.1635			
2008	4	3564107	BCR_B	-1.032	-1.3764	1.3764	
2008	6	3487526	SR	-0.3818			
2008	8	100000043330	SR	0.4265			

Table 1.72 (continued)

Year	Item Seq. No.	Item CID	Item Type	Item Difficulty	Step 0-1	Step 1-2	Step 2-3
2008	14	100000043305	SR	-0.6357			
2008	15	3514283	ECR_A	0.7105			
2008	16	3564116	ECR_B	-0.5004	-2.4388	1.4114	1.0274
2008	17	3492049	SPR	-0.391			
2008	18	100000043307	SPR	1.4660			
2008	19	3514162	SPR	0.6185			
2008	20	3487563	SPR	0.4457			
2008	21	3514595	SR	-0.9382			
2008	23	3514217	BCR_A	1.5261			
2008	24	3595406	BCR_B	0.9485	-2.9439	2.9439	
2008	25	3513648	SPR	-0.2496			
2008	26	100000043314	SPR	1.3827			
2008	31	3500154	SR	-1.1600			
2008	34	3514117	BCR_A	0.8458			
2008	35	3564111	BCR_B	0.4167	-0.8046	0.8046	
2008	36	3514114	SPR	0.5733			
2008	37	3519804	SPR	1.5395			
2008	39	3514607	ECR_A	1.4386			
2008	40	3564112	ECR_B	1.2339	-0.1186	-0.6697	0.7883
2008	44	3514266	BCR_A	1.123			
2008	45	3564120	BCR_B	0.0332	-1.3167	1.3167	
2008	48	3487539	SR	-0.592			
2008	49	3487901	SR	-2.1555			
2008	51	3487540	SR	-0.6311			
2008	54	100000043313	ECR_A	-0.4647			
2008	55	3595405	ECR_B	-1.1127	-1.1482	0.3695	0.7787
2008	56	3487913	SPR	0.9479			
2008	57	3514167	SPR	-0.2011			
2008	59	3514136	SR	-0.9134			
2008	66	3492047	SR	1.0119			
2008	68	100000043304	SR	1.3763			
2008	74	3487721	SPR	0.1096			
2008	75	3492052	SPR	1.7004			
2008	76	3514709	BCR_A	0.0865			
2008	77	3595408	BCR_B	-1.3311	-0.7377	0.7377	
2008	78	3487672	SR	0.7592			

Note. Rasch item and step difficulties are on a common scale.

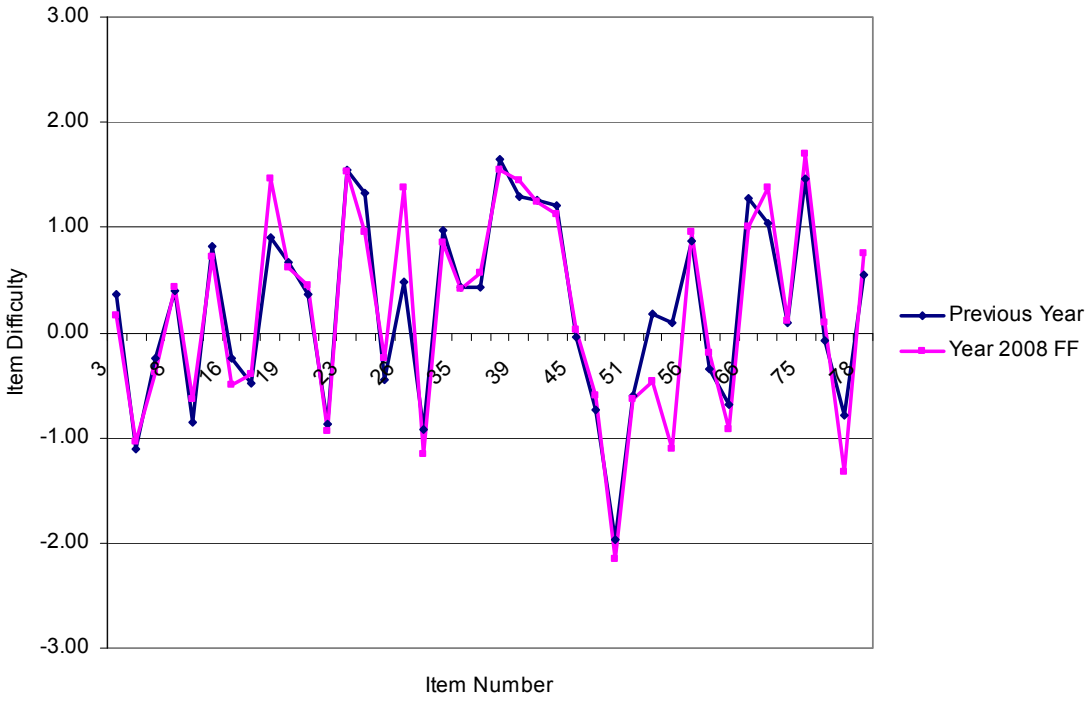


Figure 1.12 Rasch Item Difficulty Comparisons of Core Items for Previous Year vs. Year 2008: Grade 8 Form F

1.8 Field Test Analyses

All field test items embedded in operational forms were subjected to rigorous statistical analyses for their properties in order to provide information about which items may be included as operational items in the future. All statistical results concerning field test items were preserved in the 2008 Maryland item bank. Information on the item bank can be found in section 1.14, *Item Bank Construction*. The following field test analyses were conducted:

- Classical item analyses for *SR*, *SPR*, *BCR*, and *ECR* items
- *Differential item functioning* (*DIF*) analyses
- *IRT* analyses

Classical Item Analyses for *SR, SPR, BCR, and ECR* items

Classical item analyses for *SR*, *SPR*, *BCR*, and *ECR* items were conducted within each field test form.

SR items were flagged for further scrutiny if:

- An item distractor was not selected by any students (i.e., nonfunctional distractor)
- An item was selected by a high proportion of high-ability students while being selected by a low proportion of low-ability students (i.e., ambiguous distractor)
- An item *p*-value was less than .20 or greater than .90.
- An item point-biserial was less than .10 (i.e., poorly discriminating). If an item point-biserial was close to zero or negative, the item was checked for a miskeyed answer.

SPR items were flagged for further scrutiny if:

- An item *p*-value was less than .20 or greater than .90.
- An item point-biserial was less than .10 (i.e., poorly discriminating). If an item point-biserial was close to zero or negative, the item was checked for a miskeyed answer.

BCR and *ECR* items were flagged for further scrutiny if:

- An item did not elicit the full range of rubric scores.
- The ratio of mean item score to maximum score (i.e.., adjusted p-value) was less than .20 or greater than .90.
- An item-total correlation was less than .10.

All items required a careful decision. For example, an item that was flagged as being difficult (*p*-value less than .20) and poorly discriminating (point-biserial less than .10) was considered for being dropped as a possible operational item. However, if the item represented important content that had not been extensively taught, a justification could have been made for including it in an operational test form.

Differential Item Functioning Analyses

Analyses of *Differential item functioning* (*DIF*) are intended to compare the performance of different subgroups of the population on specific items, when the group have been statistically matched on their tested proficiency.

In present analyses, the gender reference group was males, and the ethnic reference group was Caucasians. The gender focal group was females and the ethic focal group was African-Americans. For each operational form, the student's total score was used as the matching variable.

Any *SR*, *SPR*, *BCR*, and *ECR* items that were flagged as showing *DIF* were subjected to further examination. For each of these items, for example, math experts judged whether the differential difficulty of the item was unfairly related to group membership using the following criteria:

- If the differential difficulty of the item is related to group membership, and the difference is deemed unfair, then the item should not be used at all.
- If the differential difficulty of the item is related to group membership, but the difference is not deemed unfair, then the item should only be used if there is no other item matching the test blueprint.

It should be noted that DIF analysis results for all the field test items were archived in the 2008 Maryland item bank. Detailed information about the *DIF* procedures can be found in section 3.7, *Differential Item Functioning*.

Item Response Theory (IRT) Analyses

To put the 2008 field test items on the base scale (i.e., the 2006 scale), each field test item was freely calibrated by fixing Rasch item and step parameters of the 2008 operational items that had been already placed on the base scale during the 2008 operational calibration and equating. For example, each unique field test item appearing on one of five math test forms (i.e., A, B, C, D, and E) was independently calibrated after fixing the same operational items appearing across the field test forms with the same Rasch item and step difficulties because these unique field test forms all correspond to the same operational form (i.e., operational form A).

It should be noted that all the Rasch item difficulties, step difficulties, and fit statistics (i.e., Rasch Infit and Outfit indices) of the field test items were archived in the 2008 Maryland item bank. These field test items are eligible to be used as operational items in subsequent years.

1.9 Operational Test Construction Using the Rasch Model

The selection of items to be included in the final operational test forms of the 2008 MSA-Math required a careful consideration based on test blueprints, classical item analyses, *DIF* analyses, and IRT analyses. Specifically, the IRT method played a major role in constructing the 2008 operational forms. First, Pearson suggested the following guidelines:

- Do not include items that are too easy or too hard.
- Do not include *BCR* items with score distributions that do not elicit the full range of rubric scores.
- Do not include items with *DIF* classifications "C" for the *SR* items and "CC" for the *BCR* items *unless* they have been deemed acceptable by the external review of content experts.
- Finally, do not include items which have Rasch *Infit* and *Outfit* mean-squares lower than .5 or higher than 1.5. More specific information on Rasch *Infit* and *Outfit* mean-squares can be found in the third part of the 2008 technical report, *Overview of Statistical Summaries*.

A procedure for using IRT methods to build tests that meet any desired set of test specifications was outlined by Lord (1977). The procedure utilizes an item bank with item parameter estimates available for the IRT model of choice, with accompanying information functions. The steps in the procedure suggested by Lord (1977) are as follows:

- First, the shape of desired test information needs to be decided. This was termed as the "target information function" by Lord (1977).
- Second, specific items need to be selected from the item bank with item information functions that will fill up hard-to-fill areas under the target information function.
- Third, the test information function after test items are added needs to be recalculated.
- Fourth, until the test information function approximates the target information function to a satisfactory degree, test items need to keep on being selected.

It should be noted that these steps were implemented within a framework defined by the content specification of the test. In addition, math content specialists from MSDE reviewed the final test forms of the 2008 MSA-Math. The following table and figure show an example of the 2008 MSA-Math operational test form construction using the IRT method. Further information on other grades can be obtained from MSDE.

Table 1.73 An Example of the 2008 Math Operational Test Construction Using the Rasch Model

Item Type	P-value	a	b1	b2	B3
BCR_A	0.67	1.00	0.0868		
BCR_B	0.55	1.00	-0.9244	2.2968	
BCR_A	0.34	1.00	1.8944		
BCR_B	0.34	1.00	0.9465	2.9753	
BCR_A	0.44	1.00	1.2891		
BCR_B	0.52	1.00	-1.7833	3.1141	
BCR_A	0.50	1.00	1.0216		
BCR_B	0.45	1.00	1.7577	0.6851	
BCR_A	0.31	1.00	1.9152		
BCR_B	0.22	1.00	1.2744	5.0228	
BCR_A	0.79	1.00	-0.6075		
BCR_B	0.47	1.00	-0.351	2.8802	
BCR_A	0.3	1.00	2.0909		
BCR_B	0.39	1.00	0.838	2.3844	
ECR_A	0.84	1.00	-1.0768		
ECR_B	0.52	1.00	-3.0549	1.1937	3.6636
SR	0.67	1.00	0.2030		
SR	0.78	1.00	-0.3310		
SR	0.71	1.00	0.0148		
SR	0.82	1.00	-1.0845		
SR	0.41	1.00	1.5483		
SR	0.40	1.00	1.5795		
SR	0.64	1.00	0.6342		
SR	0.57	1.00	0.8118		
SR	0.84	1.00	-1.1516		
SR	0.80	1.00	-0.5779		
SR	0.62	1.00	0.5383		
SR	0.86	1.00	-0.9093		
SR	0.82	1.00	-0.6898		
SR	0.51	1.00	0.6218		
SR	0.63	1.00	0.1746		
SR	0.91	1.00	-1.2550		
SR	0.85	1.00	-1.1293		
SR	0.68	1.00	0.2895		
SR	0.81	1.00	-0.6828		
SR	0.56	1.00	0.6094		
SR	0.87	1.00	-1.3086		
SR	0.63	1.00	0.4633		
SR	0.81	1.00	-0.9892		
SR	0.75	1.00	-0.5025		
SR	0.92	1.00	-1.7042		
SR	0.89	1.00	-1.6381		
SR	0.40	1.00	1.6552		
SR	0.64	1.00	0.2606		
SR	0.66	1.00	0.2013		

Table 1.73 (continued)

Type	P-value	a	b1	b2	b3
SR	0.38	1.00	1.6628		
SR	0.53	1.00	0.8800		
SR	0.74	1.00	-0.2530		
SR	0.75	1.00	-0.3576		
SR	0.46	1.00	0.9885		
SR	0.83	1.00	-1.0402		
SR	0.58	1.00	0.6766		
SR	0.52	1.00	0.8102		
SR	0.42	1.00	1.4497		
SR	0.91	1.00	-1.7982		
SR	0.72	1.00	-0.2014		
SR	0.60	1.00	0.5575		
SR	0.69	1.00	-0.0616		
SR	0.64	1.00	-0.3909		
SR	0.75	1.00	-0.8175		
SR	0.78	1.00	-0.6839		
SR	0.85	1.00	1.2809		
SR	0.53	1.00	0.0910		
SR	0.77	1.00	-0.2779		
SR	0.56	1.00	0.4459		

Note. a: item discrimination; b1: step 1 difficulty; b2: step 2 difficulty; b3: step 3 difficulty

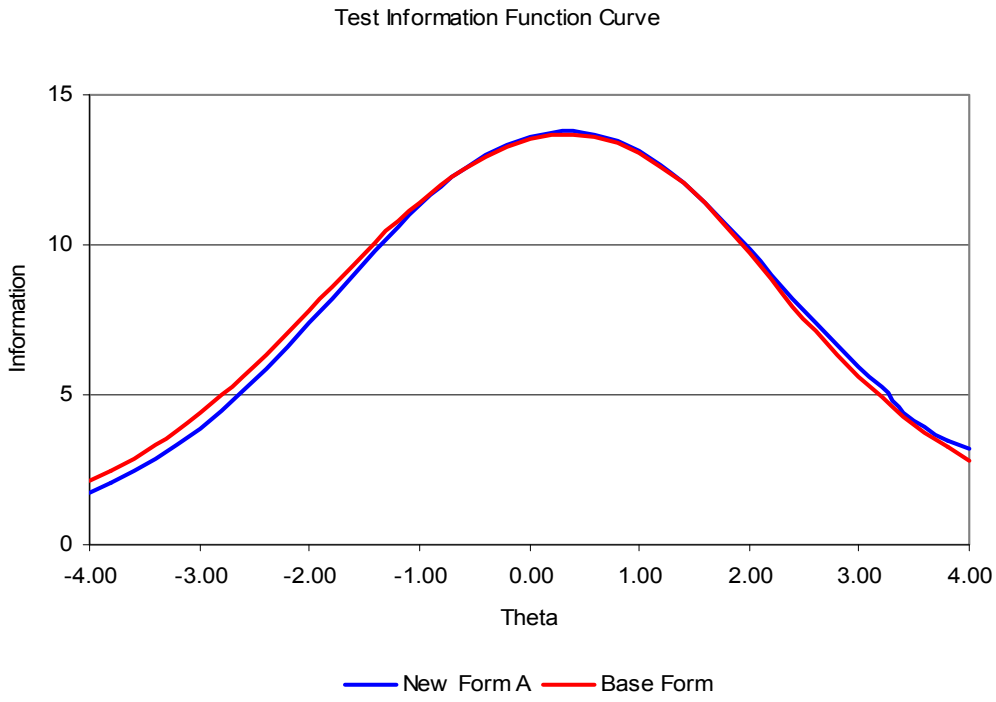


Figure 1.13 Test Information Curves of Base Form vs. Current Year's Math Operational Test Form

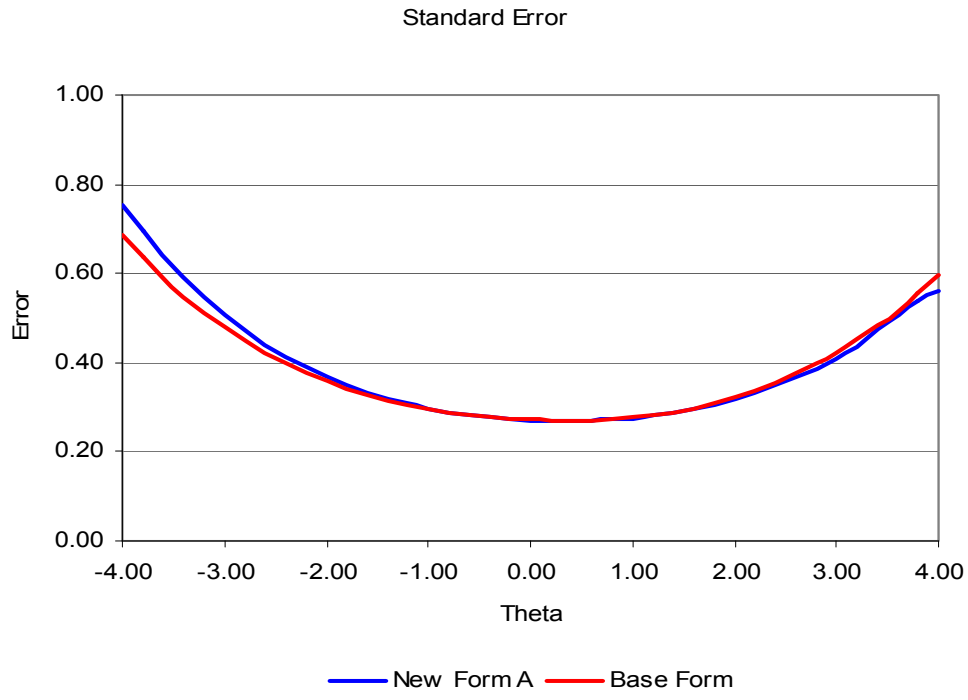


Figure 1.14 Standard Errors of Base Form vs. Current Year's Math Operational Test Form

1.10 Linking, Equating, and Scaling Procedures of the 2008 MSA-Math

The 2008 MSA-Math was calibrated, equated, and scaled by fixing the item parameters of the operational items which appeared on the 2008 and previous operational forms (i.e.., Rasch item fixed method). This means that Rasch item difficulty parameters on the common scale of the 2006 assessment were carried and fixed during the liking and equating process. It should be noted that Rasch recalibration due to IRT model transition (i.e., from 3-PL to the Rasch) was conducted using the 2006 MSA-Math data. Detailed information on the 2006 Rasch recalibration can be obtained in the 2007 MSA-Math technical report.

Stratified Random Sampling Procedures

To select equating samples, a stratified random sampling method was applied to the 2008 state examinee population. To verify that the sample was representative of the statewide examinee population in terms of school district, gender, and ethnicity, the distributions of LEA, gender, and ethnicity of the 2008 sample were compared with those of the 2008 population. Appendix A, *The 2008 MSA-Math Stratified Random Sampling*, provides the results of 2008 sampling. The results indicated that the equating samples were well representative of the statewide examinee population in terms of LEA, gender, and ethnicity.

Robust Z Procedures

Robust z values were calculated using the following calculations (South Carolina Department of Education, 2001):

- The mean and standard deviation of the linking pool's item difficulties for each operational form
- The ratio of the standard deviations between operational form A and form F
- The correlation between operational form A and F item difficulties
- The difference between operational form A and F for each item in the linking pool
- The mean of the differences calculated above
- The median of the differences calculated above
- The interquartile range of the differences calculated above
- The robust z is defined as (the difference between the test form1 and other test form item difficulty minus the median of the differences) / (interquartile range multiplied by 0.74).

Guidelines for Selecting Form-to-Form or Year-to-Year Linking Items

Once the above calculations were made, the following guidelines were followed in determining form-to-form or year-to-year common items used for Rasch linking and equating (SCDE, 2001):

- Try not to include items with an absolute value of robust z exceeding 1.645. In addition, if one item difficulty on one form of the current year is eliminated from the linking pool, other item difficulties of the other forms should not be included.
- Should not eliminate more than 20 percent of the linking pool items.
- Try to maintain that the ratio of the standard deviations between two operational forms is in the 90 to 110 percent range.
- Try to maintain the correlation between two operational forms is greater than .95.

Form-to-Form Linking Procedures

The stability of the common items appearing on both operational forms was verified at each grade level:

- Calibrate the two operational test forms separately
- Calculate robust z values of Rasch item difficulties for forms A and F
- Correlate Rasch item difficulties between form A and form F

After examining the robust z and correlations from the two separate calibrations, it was determined that the common item difficulties were consistent across the two forms for all items and could be included as form-to-form linking items in the fixed calibration of the two forms.

Year-to-Year Linking Procedures

The two 2008 operational forms included a set of year-to-year linking common items that appeared on both current and previous operational forms. We utilized the Rasch item fixed equating method for all of the operational items to be placed on a common scale within each grade.

The stability of the linking common items was evaluated using robust z values, correlation coefficients, and standard deviation ratios.

Tables 1.56 through 1.61 include Rasch item difficulties used for calculating robust z values, correlation coefficients, and standard deviations. Figures 1.14 through 1.37 depict item difficulty plots between current and previous years. It should be noted that the item difficulties of the 2008 operational forms were obtained from independent calibration, and those of previous assessments were on a common scale (i.e., linked to the 2006 assessment).

Table 1.74 Rasch Item Difficulties and Robust Z values for Previous Year vs. Year 2008: Grade 3

Item Seq No.	Previous Year	Y2008 Form A	Robust Z	Item Seq No.	Previous Year	Y2008 Form F	Robust Z
1	0.9627	0.3194	-.3882	1	0.9627	0.5535	.0888
2	0.6288	-0.0080	-.3534	2	0.6288	0.0253	-.7873
5	0.0690	-0.6618	-.8566	5	0.0690	-0.5094	-.6741
6	1.0359	0.5974	.7083	6	1.0359	0.8025	.8815
7	0.5502	-0.4334	-2.2101	7	0.5502	-0.2661	-1.7468
8	1.8411	0.7657	-2.7016	8	1.8411	0.9343	-2.1549
14	0.8740	0.2276	-.4048	14	0.8740	0.2551	-.8567
16	0.3981	-0.3428	-.9107	16	0.3981	-0.3372	-1.3816
17	-0.0360	-0.5435	.3389	17	-0.0360	-0.428	.1664
21	-0.3305	-0.8089	.4947	21	-0.3305	-0.9223	-.7345
22	2.0077	1.2651	-.9198	22	2.0077	1.5038	-.3382
23	0.4123	-0.3835	-1.2047	23	0.4123	-0.1993	-.8238
24	1.2257	0.8441	1.0130	24	1.2257	1.0837	1.2936
32	1.2515	0.6779	-.0150	32	1.2515	0.8226	.0000
33	0.0425	-0.6008	-.3882	33	0.0425	-0.3706	.0712
45	2.4187	1.9288	.4331	45	2.4187	1.7525	-1.0700
47	-1.3667	-1.5247	2.2101	47	-1.3667	-1.571	1.0127
48	-2.1822	-2.4086	1.8439	48	-2.1822	-2.2903	1.4465
49	0.4861	-0.3019	-1.1629	49	0.4861	-0.1222	-.8089
50	-0.499	-0.9164	.8213	50	-0.499	-0.6287	1.3491
51	0.2953	-0.2755	.0000	51	0.2953	-0.0972	.1641
52	-0.6165	-1.2806	-.4995	52	-0.6165	-1.0805	-.1583
55	1.2952	0.7279	.0187	55	1.2952	0.946	.3594
56	-0.5906	-1.0743	.4663	56	-0.5906	-0.9372	.3711
62	0.9229	-0.0931	-2.3836	62	0.9229	0.0706	-1.9091
63	-0.2691	-0.7012	.7426	63	-0.2691	-0.5922	.4771
64	-0.6059	-1.1106	.3539	64	-0.6059	-0.9199	.5181
65	1.4814	0.9414	.1649	65	1.4814	1.2351	.8233
66	1.8021	1.1497	-.4369	66	1.8021	1.2884	-.3824
67	1.5719	1.0426	.2222	67	1.5719	1.2735	.5884
68	0.0473	-0.5327	-.0493	68	0.0473	-0.4908	-.4924
69	0.0444	-0.2374	1.5473	69	0.0444	-0.0897	1.3293
70	0.0993	-0.3569	.6136	70	0.0993	-0.2351	.4261
72	-0.6247	-1.4077	-1.1361	72	-0.6247	-1.2908	-1.0695
82	-0.5397	-1.0778	.1751	82	-0.5397	-0.804	.7422
41A	1.6971	0.9662	-.8572	18F	1.1953	0.7507	-.0708
44A	-0.4817	-0.1209	4.9878	29F	0.1797	0.091	1.5340
				31F	-0.2581	-1.0564	-1.6656
				76F	-0.1123	-0.5583	-.0771

Note. The 2008 item sequence number was used to indicate that it was the same item appearing across years.

Note. Each item parameter was generated with a live, stratified random sample (i.e., about 3,000 students) of the year.

Note. Item parameters of previous years were on the base scale.

Note, The 2008 items were independently calibrated with the 2008 stratified random sample.

Form Statistics

Form Statistics	Previous Base Form	2008 Form A	Previous Base Form	2008 Form F
Mean	.414	-.155	.387	-.062
SD	1.007	.927	.966	.922

Correlation and Standard Deviation Ratio

With Base Form	2008 Form A	2008 Form F
Correlation	.969	.975
SD Ratio	92%	95%

Values Used for Robust Z Statistics

With Base Form	2008 Form A	2008 Form F
Mean Diff	-.569	-.449
Median Diff	-.571	-.429
IQR Diff	.252	.300

Based on correlation coefficients, SD ratios, robust z values, and item difficulty plot, none of the linking common items were dropped from the linking pool.

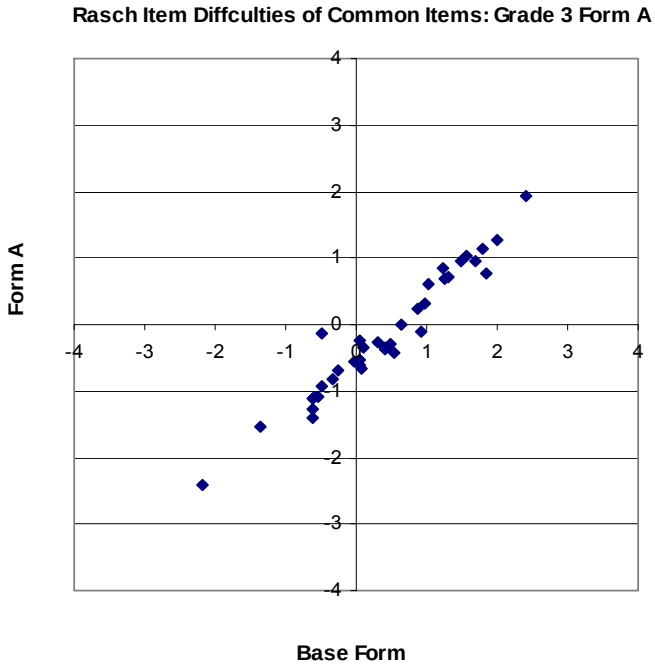


Figure 1.15 Item Difficulty Plot of Previous Year Form vs. Current Year (2008) Form: Grade 3 Form A

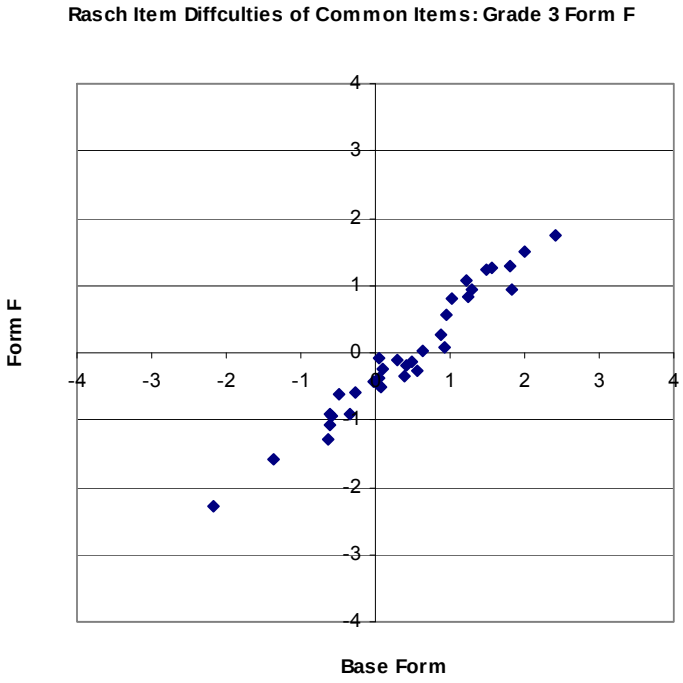


Figure 1.16 Item Difficulty Plot of Previous Year Form vs. Current Year (2008) Form: Grade 3 Form F

Table 1.75 Rasch Item Difficulties and Robust Z values for Previous Year vs. Year 2008: Grade 4

Item Seq No.	Previous Year	Y2008 Form A	Robust Z	Item Seq No.	Previous Year	Y2008 Form F	Robust Z
1	0.6241	0.5151	-.1921	1	0.6241	0.6010	-.3400
2	-0.7990	-0.8431	.0598	2	-0.7990	-0.9280	-.6862
6	0.1763	-0.2238	-1.3220	6	0.1763	-0.1258	-1.2521
7	-0.8522	-0.4349	1.8507	7	-0.8522	-0.4070	1.1909
8	-1.0550	-1.0645	.1941	8	-1.0550	-0.9838	-.0317
10	0.9009	0.7343	-.4157	10	0.9009	0.8346	-.4812
19	1.4979	1.2324	-.7996	19	1.4979	1.2857	-.9582
22	0.3940	0.3045	-.1164	22	0.3940	0.5280	.1736
24	0.5508	0.4526	-.1502	24	0.5508	0.6392	.0245
25	0.0797	0.0202	.0000	25	0.0797	0.1531	-.0245
26	1.7570	1.8603	.6319	26	1.7570	1.7678	-.2292
27	-0.1355	0.0119	.8031	27	-0.1355	0.0549	.3580
32	-0.9395	-0.508	1.9058	32	-0.9395	-0.4355	1.3831
34	-0.6701	-0.9158	-.7227	34	-0.6701	-0.8498	-.8519
47	**-0.1077**	**-1.392**	**-4.7541**	**47**	**-0.1077**	**-1.0369**	**-3.3021**
49	-0.9767	-.914	.4728	49	-0.9767	-0.7666	.4224
50	0.9291	1.233	1.4102	50	0.9291	1.2345	.7339
55	-0.4674	-0.2373	1.1241	55	-0.4674	-0.1348	.8228
56	0.7468	0.8174	.5050	56	0.7468	1.0148	.6116
64	-0.1060	-0.5082	-1.3302	64	-0.1060	-0.3638	-1.1072
66	**0.6282**	**1.3341**	**2.9709**	**66**	**0.6282**	**1.3538**	**2.1076**
67	-0.3619	-0.2492	.6684	67	-0.3619	-0.1754	.3452
69	0.5626	0.5772	.2876	69	0.5626	0.7624	.3887
70	-0.8464	-1.1027	-.7639	70	-0.8464	-1.0064	-.7875
71	-0.2943	-0.5289	-.6797	71	-0.2943	-0.3431	-.4240
78	-1.2169	-1.5502	-1.0628	78	-1.2169	-1.5338	-1.3004
79	-1.4589	-1.0696	1.7420	79	-1.4589	-1.3355	.1389
80	-0.0118	0.2558	1.2696	80	-0.0118	0.2411	.5623
81	-0.1831	-0.2465	-.0151	81	-0.1831	-0.0560	.1510
3A	-1.8595	-1.6742	.9502	33F	-2.1504	-2.5904	-1.7029
30A	0.1734	0.2351	.4704	57F	0.2215	0.0466	-.8362
31A	1.6228	1.4083	-.6016	65F	0.6346	1.0172	.9863
35A	-0.9677	-1.1138	-.3361	68F	0.6901	1.2236	1.4796
48A	-0.2051	-.625	-1.3985	77F	-2.0300	-2.2628	-1.0255
53A	1.1443	1.087	.0085				
54A	-0.7839	-0.8629	-.0757				
57A	-1.7626	-1.7364	.3326				
63A	-0.2743	-0.5841	-.9715				
68A	-0.6898	-1.0365	-1.1148				

Note. The 2008 item sequence number was used to indicate that it was the same item appearing across years.

Note. Each item parameter was generated with a live, stratified random sample (i.e., about 3,000 cases) of the year.

Note. Item parameters of previous years were on the base scale.

Note, The 2008 items were independently calibrated with the 2008 stratified random sample.

Form Statistics

Form Statistics	Previous Base Form	2008 Form A	Previous Base Form	2008 Form F
Mean	-.134	-.188	-.126	-.076
SD	.899	.937	.919	1.041

Correlation and Standard Deviation Ratio

With Base Form	2008 Form A	2008 Form F
Correlation	.937	.954
SD Ratio	104%	113%

Values Used for Robust Z Statistics

With Base Form	2008 Form A	2008 Form F
Mean Diff	-.054	.050
Median Diff	-.060	.081
IQR Diff	.348	.413

Based on correlation coefficients, SD ratios, robust z values, and item difficulty plot, item number 47 and item number 66 appearing on both forms were dropped from the linking pool.

The following correlation coefficients and SD ratios were calculated after dropping those items:

With Base Form	2008 Form A	2008 Form F
Correlation	.967	.971
SD Ratio	99%	110%

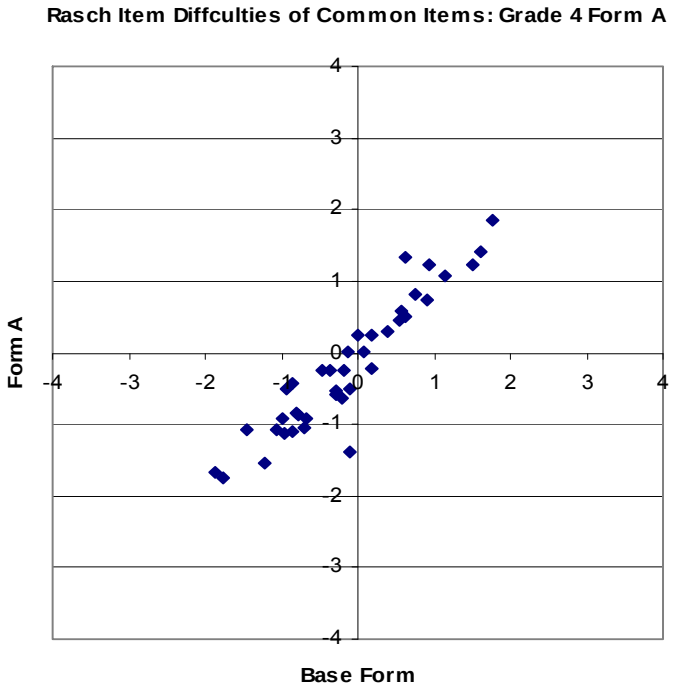


Figure 1.17 Item Difficulty Plot of Previous Year Form vs. Current Year (2008) Form: Grade 4 Form A

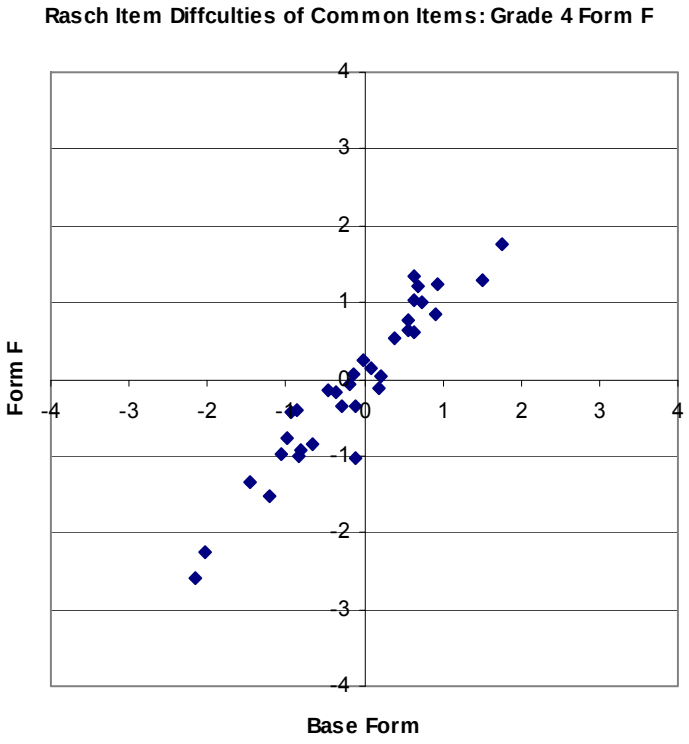


Figure 1.18 Item Difficulty Plot of Previous Year Form vs. Current Year (2008) Form: Grade 4 Form F

Table 1.76 Rasch Item Difficulties and Robust Z values for Previous Year vs. Year 2008: Grade 5

Item Seq No.	Previous Year	Y2008 Form A	Robust Z	Item Seq No.	Previous Year	Y2008 Form F	Robust Z
1	1.5795	1.3729	.0687	1	1.5795	1.4642	.9973
2	-1.0845	-1.5171	-1.0730	2	-1.0845	-1.7078	-1.7947
8	**-1.3086**	**-1.8697**	**-1.7222**	**8**	**-1.3086**	**-2.0437**	**-2.4092**
10	0.9885	0.7175	-.2566	10	0.9885	0.6722	-.1074
16	0.6094	0.5451	.7876	16	0.6094	0.4886	.9670
17	1.5483	1.3903	.3142	17	1.5483	1.3832	.7236
19	-0.9093	-1.247	-.5936	19	-0.9093	-1.2398	-.1855
21	0.4633	0.2138	-.1480	21	0.4633	0.1083	-.3201
23	0.335	0.0702	-.2253	23	0.335	-0.0192	-.3158
26	0.2030	-0.0926	-.3809	26	0.2030	-0.1482	-.2993
38	-0.3310	-0.6101	-.2975	38	-0.3310	-0.5541	.4048
39	-1.7042	-1.6243	1.5160	39	-1.7042	-1.9843	.0915
40	0.6218	0.41	.0424	40	0.6218	0.3084	-.0915
41	-1.2550	-1.4642	.0556	41	-1.2550	-1.6259	-.4075
43	-1.1293	-1.2141	.6840	43	-1.1293	-1.5220	-.5273
47	0.0148	-0.1031	.5168	47	0.0148	-0.1070	.9615
49	-0.6898	-1.2267	-1.5999	49	-0.6898	-1.3650	-2.0800
50	0.1746	0.2462	1.4741	50	0.1746	0.2196	1.8783
51	0.6342	0.3762	-.1910	51	0.6342	0.2927	-.2460
55	-0.6828	-0.9114	-.0424	55	-0.6828	-0.8574	.6713
56	0.2895	0.232	.8219	56	0.2895	0.3261	1.8321
59	-0.9892	-1.5528	-1.7348	59	-0.9892	-1.6263	-1.8706
60	-1.1516	-1.6428	-1.3690	60	-1.1516	-1.5510	-.5642
61	-0.5025	-.476	1.2448	61	-0.5025	-0.5900	1.1501
72	-0.5779	-0.6363	.8174	72	-0.5779	-0.7055	.9297
79	0.5383	0.3649	.2364	79	0.5383	0.4285	1.0275
83	-0.6839	-0.5865	1.6044	83	-0.6839	-0.7491	1.2726
20A	0.4459	0.3457	.6062	44F	1.6552	1.4963	.7576
27A	0.2606	-0.328	-1.8611	71F	-0.5862	-1.0184	-.7444
28A	1.0014	0.4695	-1.5746	**82F**	**-0.0098**	**0.2279**	**2.9374**
34A	0.8431	0.9251	1.5266				
37A	0.1548	0.0317	.4905				
69A	-1.6381	-2.0004	-.7179				
70A	-0.3862	-0.7863	-.9088				

Note. The 2008 item sequence number was used to indicate that it was the same item appearing across years.

Note. Each item parameter was generated with a live, stratified random sample (i.e., about 3,000 cases) of the year.

Note. Item parameters of previous years were on the base scale.

Note, The 2008 items were independently calibrated with the 2008 stratified random sample.

Form Statistics

Form Statistics	Previous Base Form	2008 Form A	Previous Base Form	2008 Form F
Mean	-.127	-.358	-.131	-.400
SD	.887	.941	.914	1.029

Correlation and Standard Deviation Ratio

with Base Form	2008 Form A	2008 Form F
Correlation	.978	.981
SD Ratio	106%	113%

Values Used for Robust Z Statistics

With Base Form	2008 Form A	2008 Form F
Mean Diff	-.231	-.269
Median Diff	-.220	-.297
IQR Diff	.268	.246

Item number 8 on both forms was dropped from the linking pool based on correlation coefficients, SR ratios, robust z values, and item difficulty plot. In addition, item number 82 appearing only on Form F was dropped from the linking pool.

The following correlation coefficients and SD ratios are based on dropping those items:

With Base Form	2008 Form A	2008 Form F
Correlation	.977	.986
SD Ratio	105%	110%

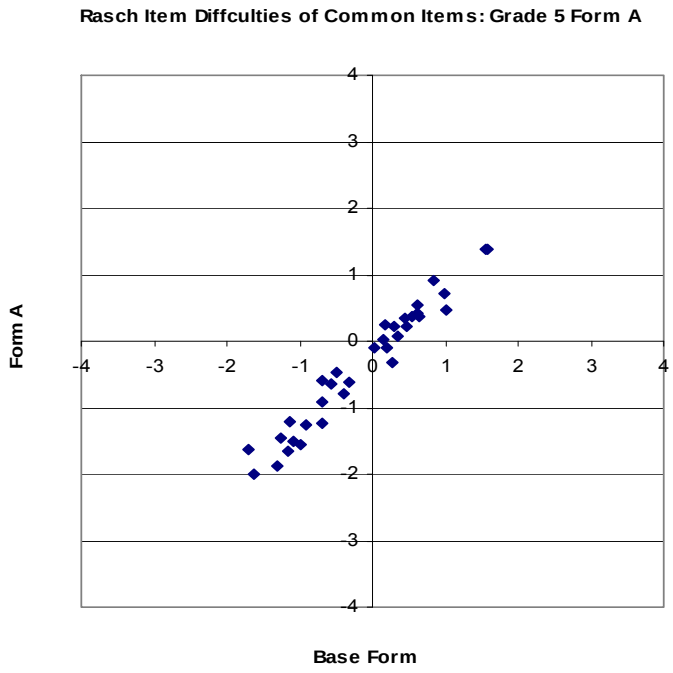


Figure 1.19 Item Difficulty Plot Previous Year Form vs. Current Year (2008) Form: Grade 5 Form A

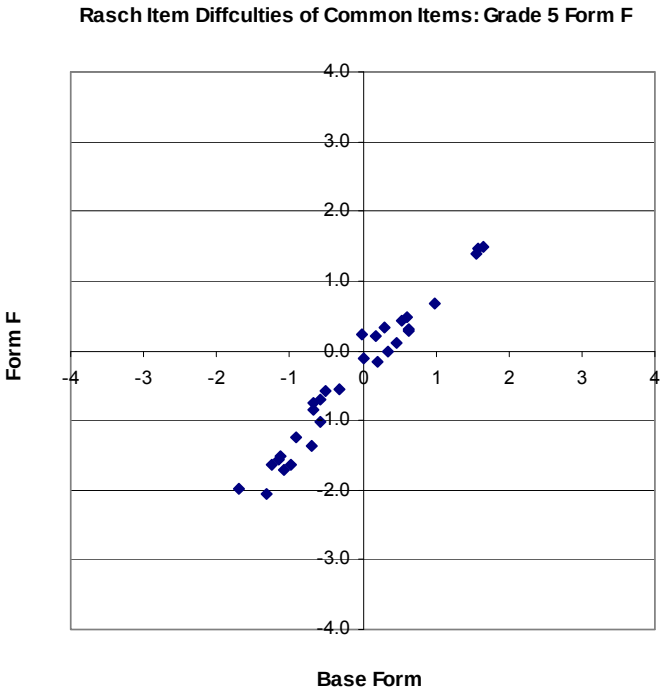


Figure 1.20 Item Difficulty Plot of Previous Year Form vs. Current Year (2008) Form: Grade 5 Form F

Table 1.77 Rasch Item Difficulties and Robust Z values for Previous Year vs. Year 2008: Grade 6

Item Seq No.	Previous Year	Y2008 Form A	Robust Z	Item Seq No.	Previous Year	Y2008 Form F	Robust Z
3	0.6406	0.7247	0.5109	3	0.6406	0.8116	0.7992
5	0.1004	-0.1971	-0.7421	5	0.1004	-0.0962	-0.4821
6	-0.2844	-0.3424	0.0443	6	-0.2844	-0.4139	-0.2482
9	**-0.7278**	**-1.2812**	**-1.5824**	**9**	**-0.7278**	**-1.3886**	**-2.1001**
10	-1.4432	-2.0424	-1.7327	10	-1.4432	-2.0239	-1.8209
11	-0.4703	-0.8228	-0.9227	11	-0.4703	-0.5946	-0.2301
19	0.2409	0.0489	-0.3957	19	0.2409	0.0717	-0.3866
21	0.9203	0.9848	0.4466	21	0.9203	1.016	0.5368
25	0.3104	0.4554	0.7109	25	0.3104	0.4412	0.6591
26	-0.1396	-0.7605	-1.8040	26	-0.1396	-0.611	-1.4399
33	-0.8160	-0.7477	0.4590	33	-0.8160	-1.243	-1.2851
34	1.1378	0.9715	-0.3113	34	1.1378	1.0391	-0.1408
35	-1.4702	-1.3704	0.5625	35	-1.4702	-1.2929	0.8212
36	0.3674	0.2934	-0.0082	36	0.3674	0.3473	0.1332
37	0.5144	0.2905	-0.5004	37	0.5144	0.1308	-1.1339
38	-0.1849	-0.2603	-0.0128	38	-0.1849	-0.2668	-0.0823
44	0.4777	0.7114	1.0021	44	0.4777	0.7307	1.0851
46	-0.4091	-0.0928	1.2734	46	-0.4091	-0.1503	1.1053
49	-0.3209	-0.6227	-0.7562	49	-0.3209	-0.7805	-1.3988
51	1.2969	0.9484	-0.9096	51	1.2969	1.1211	-0.4096
53	**-0.7843**	**-0.2535**	**1.9777**	**53**	**-0.7843**	**0.0034**	**2.9488**
55	0.5885	.7390	0.7276	55	0.5885	0.8233	1.0216
56	0.1350	.2490	0.6101	56	0.1350	0.3402	0.9184
57	-0.4092	-.2690	0.6958	57	-0.4092	-0.0781	1.3573
62	0.6588	0.3472	-0.7884	62	0.6588	0.6026	0.0073
68	0.4071	0.5456	0.6896	68	0.4071	0.8175	1.6337
69	-1.3362	-1.1197	0.9457	69	-1.3362	-1.1645	0.8017
70	-1.8302	-1.4976	1.3269	70	-1.8302	-1.619	0.9394
80	0.6580	0.5226	-0.2098	80	0.6580	0.5976	-0.0073
1A	-1.2053	-1.5261	-0.8186	**4F**	**-1.2475**	**-1.9669**	**-2.3043**
12A	0.3254	0.2564	0.0082	45F	0.8786	0.8037	-0.0579
13A	1.7544	1.6555	-0.0900	**52F**	**-0.9336**	**-0.0217**	**3.3817**
52A	0.8563	0.9000	0.3783				
79A	-0.0894	-0.2357	-0.2456				

Form Statistics

Form Statistics	Previous Base Form	2008 Form A	Previous Base Form	2008 Form F
Mean	-.016	-.082	-.109	-.125
SD	.849	.871	.828	.915

Correlation and Standard Deviation Ratio

With Base Form	2008 Form A	2008 Form F
Correlation	.951	.913
SD Ratio	103%	111%

Values Calculated for Robust Z Statistics

With Base Form	2008 Form A	2008 Form F
Mean Diff	-.067	-.017
Median Diff	-.072	-.058
IQR Diff	.412	.388

Based on correlation coefficients, SD ratios, robust z values, and item difficulty plot, item number 9 and item number 53 appearing on both forms were dropped from the linking pool. In addition, item number 4 and item number 52 appearing only on Form F were also dropped from the linking pool.

The following correlation coefficients and SD ratios were calculated after dropping those items:

With Base Form	2008 Form A	2008 Form F
Correlation	.960	.953
SD Ratio	102%	107%

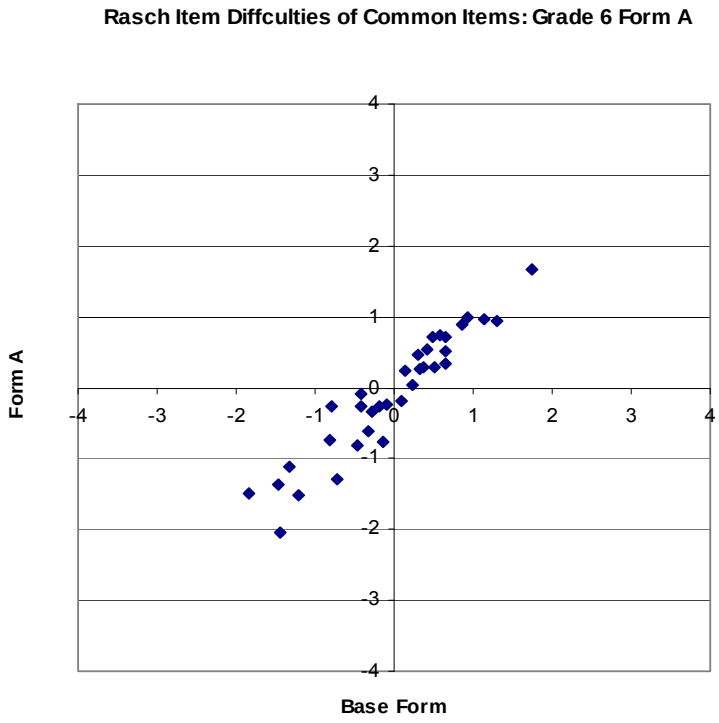


Figure 1.21 Item Difficulty Plot of Previous Year Form vs. Current Year (2008) Form: Grade 6 Form A

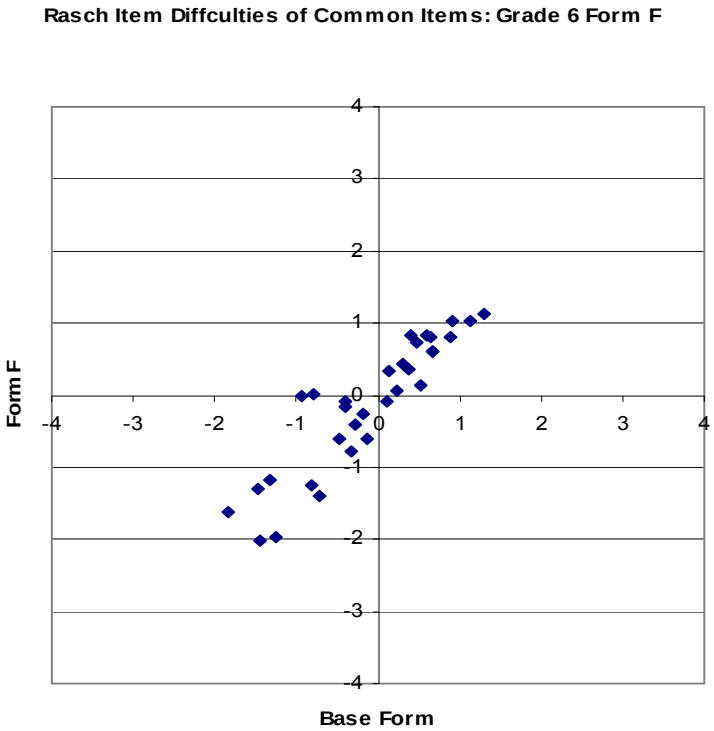


Figure 1.22 Item Difficulty Plot of Previous Year Form vs. Current Year (2008) Form: Grade 6 Form F

Table 1.78 Rasch Item Difficulties and Robust Z values for Previous Year vs. Year 2008: Grade 7

Item Seq No.	Previous Year	Y2008 Form A	Robust Z	Item Seq No.	Previous Year	Y2008 Form F	Robust Z
1	1.0539	1.2292	1.7119	1	1.0539	1.4199	1.3700
2	0.4455	0.3246	0.0445	2	0.4455	0.4549	0.0599
3	0.1508	-0.0823	-0.5872	3	0.1508	-0.0543	-0.7282
4	-0.6420	-0.8084	-0.2117	4	-0.6420	-0.6828	-0.1246
7	-0.1398	-0.3921	-0.6952	7	-0.1398	-0.3344	-0.6896
8	-0.4706	-0.6741	-0.4205	8	-0.4706	-0.5354	-0.2127
9	0.3982	0.5276	1.4535	9	0.3982	0.6043	0.7825
10	-1.1551	-1.4001	-0.6541	10	-1.1551	-1.1752	-0.0485
12	-0.4683	-0.5263	0.3986	12	-0.4683	-0.1423	1.2230
18	-0.6359	-0.6882	0.4307	18	-0.6359	-0.9090	-0.9780
19	-1.1243	-1.6423	-2.1910	19	-1.1243	-1.4982	-1.3483
20	1.5825	1.3717	-0.4616	20	1.5825	1.5900	0.0529
27	0.9745	0.9564	0.6232	27	0.9745	1.2557	1.0585
30	-0.5147	-0.0711	3.2223	30	-0.5147	0.3714	3.2808
31	-2.6820	-2.8987	-0.4948	31	-2.6820	-2.8542	-0.6073
32	0.0227	-0.1885	-0.4639	32	0.0227	0.0290	0.0485
42	-0.6119	-0.7860	-0.2556	42	-0.6119	-0.9560	-1.2388
43	-0.4094	-0.4780	0.3389	43	-0.4094	-0.3685	0.1756
49	-1.6395	-1.7683	0.0000	49	-1.6395	-1.5025	0.5287
51	-0.0583	-0.0385	0.8365	51	-0.0583	0.0383	0.3802
52	-1.4991	-1.8734	-1.3820	52	-1.4991	-1.5797	-0.2708
64	0.0092	-0.0572	0.3513	64	0.0092	-0.1661	-0.6187
65	-0.4333	-0.6475	-0.4808	65	-0.4333	-0.4830	-0.1572
66	-0.2963	-0.7720	-1.9529	66	-0.2963	-0.7557	-1.6624
69	0.5231	0.1496	-1.3775	69	0.5231	0.4027	-0.4170
71	-0.7302	-0.6375	1.2469	71	-0.7302	-0.5134	0.8219
79	-1.4603	-1.0930	2.7928	79	-1.4603	-0.9985	1.7220
80	-0.5723	-0.3801	1.8071	80	-0.5723	-0.3812	0.7274
44A	0.6653	0.3420	-1.0949				
63A	0.5663	0.5768	0.7842				
72A	0.6673	0.7070	0.9486				

Note. The 2008 item sequence number was used to indicate that it was the same item appearing across years.

Note. Each item parameter was generated with a live, stratified random sample (i.e., about 3,000 cases) of the year.

Note. Item parameters of previous years were on the base scale.

Note, The 2008 items were independently calibrated with the 2008 stratified random sample.

Form Statistics

Form Statistics	Previous Base Form	2008 Form A	Previous Base Form	2008 Base Form
Mean	-.274	-.378	-.371	-.347
SD	.898	.942	.891	.965

Correlation and Standard Deviation Ratio

With Base Form	2008 Form A	2008 Form F
Correlation	.972	.956
SD Ratio	105%	108%

Values Used for Robust Z Statistics

With Base Form	2008 Form A	2008 Form F
Mean Diff	-.104	.024
Median Diff	-.129	-.007
IQR Diff	.240	.368

Based on correlation coefficients, SD ratios, robust z values, and item difficulty plot, none of the linking common items were dropped from the linking pool.

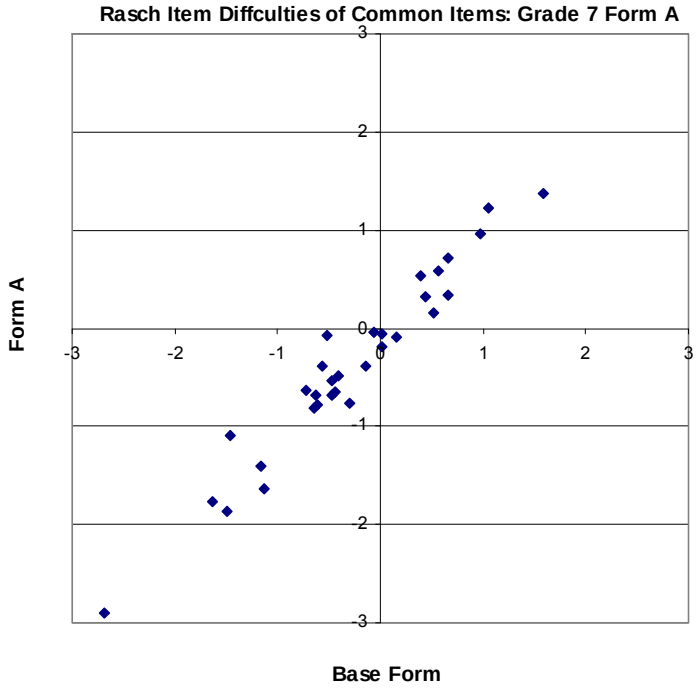


Figure 1.23 Item Difficulty Plot of Previous Year Form vs. Current Year (2008) Form: Grade 7 Form A

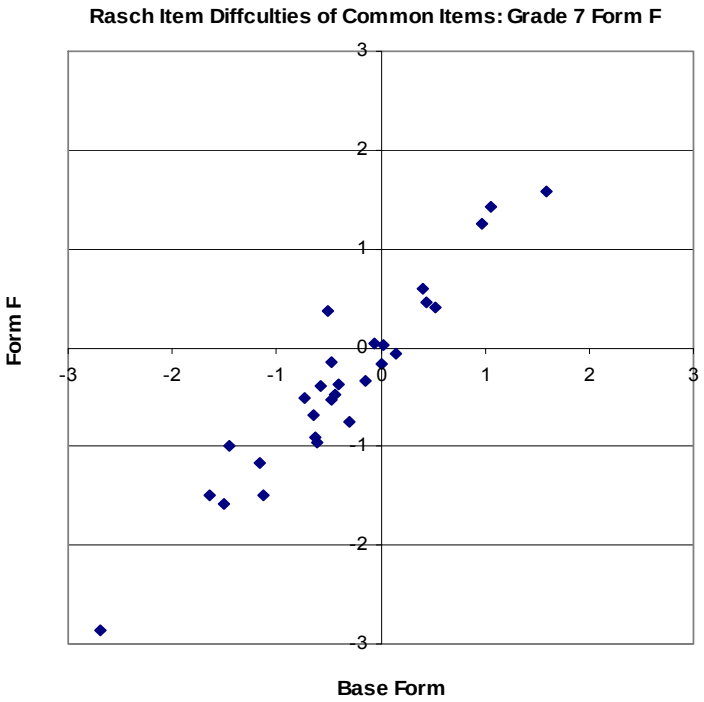


Figure 1.24 Item Difficulty Plot of Previous Year Form vs. Current Year (2008) Form: Grade 7 Form F

Table 1.79 Rasch Item Difficulties and Robust Z values for Previous Year vs. Year 2008: Grade 8

Item Seq No.	Previous Year	Y2008 Form A	Robust Z	Item Seq No.	Previous Year	Y2008 Form F	Robust Z
1	1.4965	1.1502	-1.1673	1	1.4965	1.4878	0.2847
2	-0.2177	-0.4902	-0.6306	2	-0.2177	-0.3137	-0.6109
5	-1.3613	-1.6955	-1.0793	5	-1.3613	-1.5966	-2.0400
7	-1.2003	-1.4260	-0.2902	7	-1.2003	-1.3021	-0.6704
22	-0.5815	-0.8619	-0.6880	22	-0.5815	-0.8328	-2.2041
32	1.0306	0.9439	0.7208	32	1.0306	1.0118	0.1811
33	0.5139	0.3190	-0.0662	33	0.5139	0.4341	-0.4447
38	-1.4001	-1.5560	0.2175	38	-1.4001	-1.4472	-0.1093
41	0.5661	-0.1043	-3.5246	41	0.5661	0.1477	-3.9184
42	-0.9380	-0.9479	1.2793	42	-0.9380	-0.9487	0.2642
43	-1.0563	-1.3020	-0.4357	43	-1.0563	-1.0821	0.1093
46	-0.2581	-0.4220	0.1600	46	-0.2581	-0.3181	-0.2416
47	-0.1085	-0.2010	0.6764	47	-0.1085	0.0413	1.9107
52	0.3257	0.4442	2.2132	52	0.3257	0.3892	1.0254
53	-0.6275	-0.8133	0.0000	53	-0.6275	-0.6853	-0.2190
58	0.2379	0.2491	1.4328	58	0.2379	0.5491	3.5665
64	1.2102	1.0693	0.3266	64	1.2102	1.2525	0.8079
67	-0.5330	-1.0868	-2.6765	67	-0.5330	-0.9848	-4.2610
79	-0.1424	-0.3414	-0.0960	79	-0.1424	-0.1102	0.7043
80	-1.3743	-1.1675	2.8554	80	-1.3743	-1.1695	2.4750
66A	1.8701	1.8947	1.5303	50F	-1.9767	-1.5105	5.1566
				65F	0.1391	0.0760	-0.2734

Note. The 2008 item sequence number was used to indicate that it was the same item appearing across years.

Note. Each item parameter was generated with a live, stratified random sample (i.e., about 3,000 cases) of the year.

Note. Item parameters of previous years were on the base scale.

Note, The 2008 items were independently calibrated with the 2008 stratified random sample.

Form Statistics

Form Statistics	Previous Base Form	2008 Form A	Previous Base Form	2008 Form F
Mean	-.121	-.302	-.284	-.314
SD	.975	.996	.925	.918

Correlation and Standard Deviation Ratio

With Base Form	2008 Form A	2008 Form F
Correlation	.979	.975
SD Ratio	102%	99%

Values Used for Robust Z Statistics

With Base Form	2008 Form A	2008 Form F
Mean Diff	-.181	-.030
Median Diff	-.186	-.036
IQR Diff	.186	.132

Based on correlation coefficients, SD ratios, robust z values, and item difficulty plot, none of the linking common items were dropped from the linking pool.

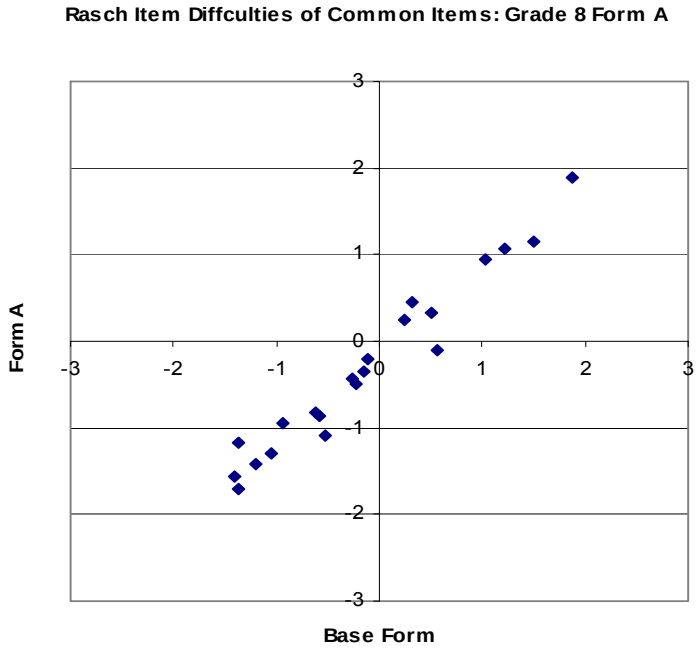


Figure 1.25 Item Difficulty Plot of Previous Year Form vs. Current Year (2008) Form: Grade 8 Form A

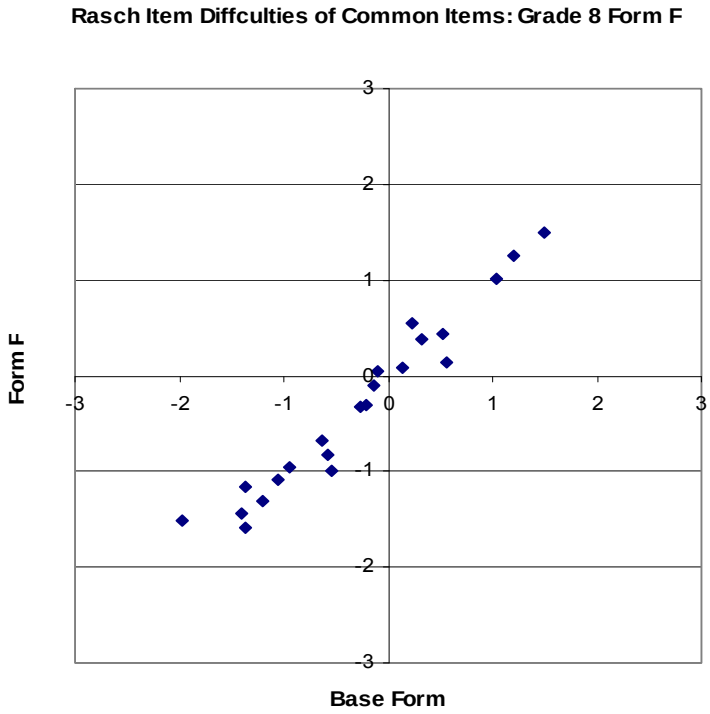


Figure 1.26 Item Difficulty Plot of Previous Year Form vs. Current Year (2008) Form: Grade 8 Form F

Reporting Scale Scores

In order to facilitate the use and interpretation of the results of the 2008 MSA-Math, the following formula was used to convert each student's ability or theta to the reporting scale score:

$$ReportingAbilityScaleScore = 32.8398 \cdot theta + 380.2954$$

$$ReportingSE = 32.8398 \cdot SE$$

where

theta = the Rasch (i.e., 1-PL *IRT*) ability estimate, and

SE = the conditional standard error of the ability estimate.

The following table contains information about the slopes and intercepts used to generate the 2008 scale scores. First of all, it should be noted that the slopes and intercepts were obtained during the 2006 recalibration. The same slopes and intercepts have been used since the 2006 assessment.

Table 1.80 The 2008 MSA-Mathematic Slope and Intercept: Grades 3 through 8

Grade	Slope	Intercept
3	32.6935	352.2959
4	32.8398	380.2954
5	30.7057	390.2866
6	29.6236	398.5595
7	28.1690	405.9549
8	28.3634	418.4843

1.11 Score Interpretation

To help provide appropriate interpretation of the 2008 MSA-Math test scores, two types of scores were created: 240-650 scale scores, and performance levels and descriptions.

240-650 Scale Scores

As explained in section 1.10, *Linking, Equating, and Scaling Procedures*, the 2008 MSA-Math produced scale scores that ranged between 240 and 650. These scale scores have the same meaning within the same grade, but are not comparable across grade levels.

It should be noted that for scale scores, a higher score simply means a higher performance on math tests. Thus, performance levels and descriptions can give a specific interpretation other than a simple interpretation because they were developed to bring meaning to those scale scores.

Performance Level Descriptors

As previously explained, performance level descriptors provide specific information about students' performance levels and help interpret the 2008 MSA-Math scale scores. They describe what students at a particular level generally know and can be applicable to all students within each grade level.

Maryland standards are divided into three levels of achievement (*www.marylandpublicshools.org*):

- Advanced is a highly challenging and exemplary level of achievement indicating outstanding accomplishment in meeting the needs of students.
- Proficient is a realistic and rigorous level of achievement indicating proficiency in meeting the needs of students.
- Basic is a level of achievement indicating that more work is needed to attain proficiency in meeting the needs of students.

Table 2.1 shows a range of scale scores at each performance level; for example, grade 4 math scale scores from 374 to 432 indicate the level of *Proficient*. Students in this level passed the MSA-Math standard. This level is considered a realistic and rigorous level of achievement. Further information about the 2008 MSA-Math score interpretation can be obtained from MSDE.

1.12 Test Validity of the 2008 MSA-Math

As noted in the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 1999), "validity is the most important consideration in test evaluation."

Messick (1989) defined validity as follows:

> Validity is an integrated evaluative judgment of the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of inferences and actions based on test scores or other modes of assessment. (p.5)

This definition implies that test validation is the process of accumulating evidence to support intended use of test scores. Consequently, test validation is a series of ongoing and independent processes that are essential investigations of the appropriate use or interpretation of test scores from a particular measurement procedure (Suen, 1990).

In addition, test validation embraces all of the experimental, statistical, and philosophical means by which hypotheses and scientific theories can be evaluated. This is the reason that validity is now recognized as a unitary concept (Messick, 1989).

To investigate the validity evidence of the 2008 MSA-Math, content-related evidence, item development procedures, differential item functioning (DIF) analysis on gender and ethnicity, and evidence from internal structure were collected.

Content-Related Evidence

Content validity is frequently defined in terms of the sampling adequacy of test items. That is, content validity is the extent to which the items in a test adequately represent the domain of items or the construct of interest (Suen, 1990). Consequently, content validity provides judgmental evidence in support of the domain relevance and representativeness of the content in the test (Messick, 1989).

The 2008 MSA-Math blueprints provide extensive evidence regarding the alignment between the content in the 2008 MSA-Math and the *VSC*. It should be noted that the 2008 MSA-Math operational test forms were built exclusively using a Maryland item bank program which contained both content and statistical information about both operational and field-tested items. Information on the item composition of the operational test forms can be obtained from section 1.4, *Test Form Design, Specifications, Item Type, and Item Roles*. In addition, the 2008 MSA-Math blueprints are presented in Appendix D.

Item Development

Test development for MSA-Math is ongoing and continuous. Content specialists, teachers from across Maryland, Pearson, and MSDE were greatly involved in developing and reviewing items. Committees such as content review, bias review, and vision review reviewed all of the items, which were finally stored in a Maryland item bank. Specifically, an internal review by MSDE and Pearson staff for content alignment and quality required a great deal of time and energy. More specific information on item (test) development and review can be obtained in section 1.3, *Development and Review of the 2008 MSA-Math Items and Test*.

Field test items were embedded and administered in one of ten test forms. Once these items were scored, MSDE and Pearson conducted additional item analysis and content review. Any field test items that exhibited statistical results that suggested potential problems were carefully reviewed by both MSDE and Pearson content specialists. A determination was then made as to whether an item should be eliminated, revised, or field-tested again. Information on statistical analyses for field test items can be obtained in section 1.9, *Field Test Analyses*.

Differential Item Functioning **(DIF)**

1) Bias Review of Items

A separate Bias Review Committee examined each math item, with looking for indications of bias that could impact the performance of an identifiable group of students. They discussed or rejected items biased on gender, ethnic, religious, or geographical bias.

2) *DIF* Statistics

For DIF analyses, subgroups were first identified according to either reference or focal groups. For the 2008 MSA-Math, males and whites were assigned to the reference group and females and African-Americans were assigned to the focal group.

While the Mantel-Haenszel procedure was used for SR and SPR items, the standardized mean difference (SMD) and the standard deviation (SD), along with the Mantel statistic, were calculated for BCR and ECR items. All of the items were classified based on Educational Testing Service (ETS) guidelines. All *DIF* results were kept in the 2008 Maryland item bank. More information on *DIF* analyses can be obtained in section 3.7, *Differential Item Functioning*.

Evidence from Internal Structure

The 2008 MSA-Math has five math strands: *Algebra, Geometry and Measurement, Statistics and Probability, Numbers and Computations,* and *Process*. Tables 4.3 through 4.8 show the correlations among the math strands.

1.13 Unidimensionality Analyses of the 2008 MSA-Math

Measurement implies order and magnitude along a single dimension (Andrich, 1989). Consequently, in the case of scholastic achievement, one-dimensional scale is required to reflect this idea of measurement (Andrich, 1988, 1989). However, unidimensionality cannot be strictly met in a real testing situation because students' cognitive, personality, and test-taking factors usually have a unique influence on their test performance to some level (Andrich, 1988; Hambleton, Swaminathan, & Rogers, 1991). Consequently, what is required for unidimensionality to be met is an investigation of the presence of a dominant factor that influences test performance. This dominant factor is considered as the ability measured by the test (Andrich, 1988; Hambleton et al., 1991; Ryan, 1983).

To check the unidimensionality of the 2008 MSA-Math, we examined the relative sizes of the eigenvalues associated with a principal component analysis of the item set. First, polychoric correlation coefficients were computed with *LISREL 8.5* (Jöreskog & Sörbom, 1993) because they were polytomously scored on math items. Principal component analysis was then applied to produce eigenvalues. The first and the second principal component eigenvalues were compared *without rotation*. Table 1.81 summarizes the results of the first and second principal component eigenvalues of the 2008 MSA-Math.

A general rule of thumb in exploratory factor analysis suggests that a set of items may represent as many factors as there are eigenvalues greater than 1 in this analysis because there is one unit of information per item and the eigenvalues sum to the total number of items. However, a set of items may have multiple eigenvalues greater than 1 and still be sufficiently unidimensional for analysis with IRT (Loehlin, 1987; Orlando, 2004). As seen from the following table, the first component extracted substantially larger eigenvalues across all grades: the size of the eigenvalue of the first component was over ten times greater than the second eigenvalue for each form at each grade. As a result, we could conclude that the assumption of unidimensionality for the 2008 MSA-Math was met.

Table 1.81 The 2008 MSA-Math Eigenvalues between the First and Second Components

Grade	Form	Number of Items	First Eigenvalue	Second Eigenvalue
3	A	65	21.76	1.82
	F	65	22.36	1.95
4	A	64	22.74	1.99
	F	64	22.94	1.94
5	A	65	22.74	1.95
	F	65	23.27	1.94
6	A	62	23.99	1.74
	F	62	23.80	1.82
7	A	62	26.46	2.49
	F	62	27.10	2.27
8	A	62	25.18	2.17
	F	62	25.71	2.02

Note. Form A designates the operational portion of Forms A, B, C, D, and E, which is identical. Form F designates the operational portion of Forms F, G, H, J, and K, which is identical.
Note. Analysis was conducted with a statewide population.

1.14 Item Bank Construction

The number of test forms to be constructed each year, and the need to replace items that would be released to the public, necessitated the availability of a large pool of items. The 2008 MSA-Math item bank continues to be maintained by Pearson in the form of computer files and paper copies. This enables test items to be readily available to both Pearson and MSDE staff for reference, test construction, test book design, and printing.

Pearson maintains a computerized statistical item bank to store supporting and identification information for each item. The information stored in this item bank for each item is as follows:

- CID
- Test administration year and season
- Test form
- Grade level
- Item type
- Item stem and options
- Passage code and title
- Subject code and description
- Process code and description
- Standard code and description
- Indicator code and description
- Objective code and description
- Item status
- Item statistics

It should be noted that each field test item of each form was calibrated by fixing each operational item with its operational Rasch items parameter. For example, all of the field test items of test forms A, B, C, D and E were independently calibrated after fixing the same items appearing on the five forms with the same operational item parameters, since each field test form belonged to the same operational form A. Item difficulties, step difficulties, and infit and outfit fit statistics of all the field test items were stored in the 2008 item bank.

1.15 Quality Control Procedures

A standard quality procedure at Pearson was to create a test deck for MSA programs. The test deck began when Quality Assurance entered mock data into the enrollment system, which was transferred to the materials requisition system; the order was packaged by our Distribution Center, and shipped to the Quality Assurance Department. We then reviewed the packing list against the data entered, the materials algorithms applied, the materials packaged against the packing list, and the actual packaging of the documents. These documents were then used to create a test deck of mock data, along with advance copies of documents that were received from the printer. Advance printer copies were inclusive of documents throughout the print run to assure we were randomly testing printed documents. The Maryland test deck was a comprehensive set of all documents that:

- Verified all scan positions for item responses and demographics to verify scanning setup and scan densities
- Verified all constructed response score points, zoning of image, reader scoring, reader resolution, and reader check scores
- Verified the handling of blank documents through the system
- Test all demographic and item edits
- Verified pre-id bar code read, match and no-match
- Verified attemptedness rules applied by subtest
- Verified duplicate student handling (same test duplicate, different test duplicate)
- Verified duplicate student with different demographics ruedles applied
- Verified the document counts to the enrollment, pre-id and actual document receipt
- Verified pre-id matching and application to student record
- Verified various raw score points and access to dummy and live scoring tables
- Verified cut scores applied
- Verified valid score on one subtest and invalid score on other subtest
- Verified scoring applied to Braille and Large Print
- Verified valid multiple choice and invalid constructed response
- Verified valid constructed response and invalid multiple choice
- Verified all special scoring rules
- Verified all summary programs for rounding
- Verified summary inclusion and exclusion (Braille, standard and non-standard student summarization)
- Verified each scoring level for group reporting
- Verified all reporting programs for accuracy in all text and data presented
- Verified class, school, district, and state summary data on home reports
- Verified all data file programs to assure valid information in every field

- Verified data descriptions for accuracy against data file
- Created compare programs to allow for update of files

The Maryland test deck was the first order processed through the Maryland system to verify all aspects of the materials packaging, scanning, editing, scoring, summary, and reporting. Pre-determined conditions were included in the test deck to assure the programs were processing all data to meet the requirements of the program with zero defects. Processing of live orders could not proceed until each phase of the test deck had been approved by our Quality Assurance Department. An Issues Log with sign-off approvals was utilized to assure we were addressing any issues that arose in the review of the test deck data across all functional groups at Pearson.

Prior to release of any order for reporting we received a preliminary file from Scoring Operations to run a key check TRIAN to assure that all scoring keys had been determined and applied accurately. Any item that was not performing as expected was flagged and reviewed by our content specialist and psychometrician. Upon completion of the key check, we proceeded to run the pilot level reports.

We ran the pilot district utilizing live data. The pilot district included multiple buildings, all grades, and any unique accommodations. A formal pilot review process was conducted with Pearson staff experts prior to release of the information to MSDE.

Upon completion of the processing of all district-level data, Pearson Scoring Operations provided the Quality Assurance Department with one or more state-level data files, along with state data for review and approval. Pearson Quality Assurance programmers duplicated all data independently to ensure accurate interpretation of the expected results. A series of SAS programs were run on these files to ensure 100% accuracy. These included but were not limited to:

- Statewide Duplicate Student
- Statewide FD of Demographic Variables
- District/Building/N-Count
- Statewide RS/SS/Cut Score tables
- Proc Means to verify summary statistics
- Item Response listing to verify all constructed responses were scored and within the valid range
- Normative data check for all raw scores
- Reader Resolution report to verify all readings and resolution combinations

Upon complete review and approval by Quality Assurance, we posted the statewide student files to a secure FTP site for review by MSDE.

2. CURRENT RESULTS OF THE 2008 MSA-MATH

This section provides information about performance achievement results of Maryland students in grades 3 through 8. Table 2.1 contains information about the cutoff score of each performance level. Table 2.2 contains the pass rate of each performance level. It should be noted that the same cutoff scores have been applied since 2003 (for grades 3, 5, and 8) or 2004 (for grades 4, 6, and 7).

Table 2.1 MSA-Math Cut Scores: Grades 3 through 8

Grade	Cut Score of Performance Level	
	Proficient	Advanced
3	379	441
4	374	433
5	392	453
6	396	447
7	396	451
8	407	444

Note. Performance level cuts have been applied since 2003 (grades 3, 5, and 8) or 2004 (grades 4, 6, and 7).

Table 2.2 The 2008 MSA- Mathematics Pass Rates: Grades 3 through 8

Grade	*N*	Percentage of Performance Level		
		Basic	Proficient	Advanced
3	58,617	17.65	55.80	26.56
4	60,034	11.67	46.08	42.25
5	60,826	19.70	55.00	25.30
6	61,352	24.39	43.88	31.73
7	62,852	31.98	46.40	21.62
8	64,061	38.30	32.76	28.94

Note. Percentages may not add up to 100% due to rounding.

Note. Analysis was conducted with a statewide population.

3. OVERVIEW OF STATISTICAL SUMMARIES

This section provides general information about statistical and psychometric summaries used for the 2008 MSA-Math program. Actual statistical results described in this section appear in section 4 and appendices.

3.1 Classical Descriptive Statistics

Table 4.1 contains the classical descriptive statistics of each form for each grade and includes:

- Form number
- Number of items
- Numbers of students (These numbers were based on a whole population.)
- Means and standard deviations of raw scores
- Stratified Cronbach Alpha
- Standard error of measurement (SEM)

Stratified Cronbach Alpha

The 2008 MSA-Math tests included *SR, SPR, BCR,* and *ECR* items. Consequently, it was necessary to use an adequate reliability coefficient that addressed the important factor, different item type. The following formula depicts the reliability coefficient, *Stratified Cronbach Alpha*:

$$Stratified\ \ a = 1 - \frac{((\sigma_{SR}^2(1-\rho_{SR}) + (\sigma_{CR}^2(1-\rho_{CR}))}{\sigma_t^2}$$

where

σ_{SR}^2 = variance of score on SR and SPR items

σ_{CR}^2 = variance of score on BCR and ECR items

σ_t^2 = variance of total score

ρ_{SR} = reliability coefficient of score on SR and SPR items, and

ρ_{CR} = reliability coefficient of score on BCR and ECR items.

Standard Error of Measurement (Based on Classical Test Theory)

The *standard error of measurement* (*SEM*) is commonly used in interpreting and reporting individual test scores and score differences on tests (Harvill, 1991).

Classical test theory is based on the following assumptions (Andrich & Luo, 2004):

- Each person *v* has a true score on the construct, usually denoted by the variable T_v
- The best overall indicator of the person's true score is the sum of the scores on the items and is usually denoted by the variable X_v
- This observed score will have an error for each person which is usually denoted by E_v
- These errors are not correlated with the true score
- Across a population of people, the errors sum to 0 and they are normally distributed.

From these assumptions, the following equations can be derived:

$$X_v = T_v + E_v .$$

Therefore,

$$\sigma_x^2 = \sigma_t^2 + \sigma_e^2$$

where

σ_x^2 = the variance of the observed score in a population of persons,

σ_t^2 = the variance of their true score variance, and

σ_e^2 = the error variance.

The reliability coefficient of the test can be calculated by the following formula:

$$\rho_x = \frac{\sigma_t^2}{\sigma_x^2} = \frac{\sigma_x^2 - \sigma_e^2}{\sigma_x^2} .$$

Thus, the *SEM* is calculated by the following formula:

$$\sigma_e = \sigma_x \sqrt{1 - \rho_x} .$$

For example, consider a student with a score of 90 from a sample of students with a mean score of 60 and variance of 225 on a test with reliability of 0.80. According to the formulas provided above, the obtained score is 90, and its *SEM* is 6.71. Thus, an approximate 68% score band for estimating this student's true score is from 83.29 (90 - 6.71) to 96.71 (90 + 6.71).

Note that this equation is only useful to estimate true score when the test reliability is reasonably high and the obtained score for the examinee is not an extreme deviate from the mean of the appropriate reference group. When we use this equation, consequently, we should be careful with statements so that they do not imply greater precision than is actually involved (Harvill, 1991).

Conditional Standard Error of Ability Estimate (Based on the Rasch Model)

Under the Rasch (i.e., 1-PL IRT) model, the *SE* for each person is as follows (Andrich & Luo, 2004):

$$\sigma_{\hat{\beta}} = \frac{1}{\sqrt{\sum_{i=1}^{L} p_{vi}(1-p_{vi})}}$$

where

v = subscript for a person,

i = subscript for an item,

L = length of the test,

$\hat{\beta}$ = ability estimate, and

p_{vi} = the probability that a person answers an item correctly and defined as follows:

$p_{vi} = \frac{e^{\beta_v - \delta_i}}{1+e^{\beta_v - \delta_i}}$ where β_v is person's ability and δ_i is item's difficulty.

A confidence band can be found for use in interpreting the ability estimate. For example, an approximate 68% confidence interval for $\hat{\beta}$ is given by

$$\hat{\beta} \pm SE$$

3.2 Scale Score Descriptive Statistics

Table 4.2 provides information about scale score descriptive statistics of each form for each grade and includes:

- Form number
- Number of items
- Numbers of students
- Mean and standard deviation of scale scores
- 10% quantile (P10), 25% quantile (Q1), median (P50), 75% quantile (Q3), 90% quantile, and IQR (Interquantile Range= Q3-Q1)
- Conditional *standard errors* (*SE*) for the proficient and advanced cut scores

In addition, Appendix A provides frequency distributions and histograms of the scale scores of the 2008 MSA-Math as well as the 2006 MSA-Math.

3.3 Classical and Rasch (1-Paramter Logistic IRT) Item Parameters

Appendix C provides both classical and Rasch item parameters and includes:

- Item type (*SR*, *SPR*, *BCR*, or *ECR*)
- *P*-value: in order for *p*-values of *BCR* and *ECR* items to be comparable with *p*-values of the *SR* and *SR* items they were calculated as modified proportions of the maximum obtainable domain scores.
- Point-biserial correlation: a Pearson's *r* between the scored item and the total score
- Rasch item difficulty estimate (D_i)
- Conditional standard error of Rasch item difficulty estimate
- Rasch step difficulty estimate (or structure calibration estimate, F_{ij})
- Mean-square infit
- Mean-square outfit

First of all, it should be noted that all the Rasch item and step difficulty parameters were placed on a common scale (i.e., the 2003 scale for grades 3, 5, and 8; the 2004 scale for grades 4, 6, and 7).

Second, the following formula shows how structure measure estimate (D_{ij}) is calculated from both D_i and F_{ij} directly obtained from a run of Winsteps:

$$D_{ij} = D_i + F_{ij},$$

where D_{ij} = structure measure estimate

D_i = item difficulty estimate,

F_{ij} = structure calibration estimate (i.e., step difficulty estimate).

Finally, the following formulas show how conditional standard error (SE) of item difficulty estimate (D_i) and structure measure estimate (F_{ij}) were driven (Wright & Masters, 1982):

$$\mathrm{SE}(D_i) = 1/\sqrt{\sum_{n=1}^{N}[\sum_{k}^{m_i} k^2 p_{nik} - (\sum_{k}^{m_i} k p_{nik})^2]}$$

$$\mathrm{SE}(F_{ij}) = 1/\sqrt{\sum_{n=1}^{N}(\sum_{k=0}^{j} p_{nik} - (\sum_{k=j+1}^{m_i} p_{nik})^2)}$$

where $P_{nix} = \exp\sum_{j=0}^{x}(\theta_n - D_{ij}) / \sum_{k=0}^{m_i}\left[\exp\sum_{j=0}^{k}(\theta_n - D_{ij})\right]$

$x = 0, 1, ..., m_i$, and

k = 1, 2,…., m_i.

Fit Statistics for the Rasch Model

Fit statistics are used for evaluating the goodness-of-fit of a model to the data. Fit statistics are calculated by comparing the observed and expected trace lines obtained for an item after parameter estimates are obtained using a particular model. *WINSTEPS* provides two kinds of fit statistics called *mean-squares* that show the size of the randomness or amount of distortion of the measurement system.

Outfit mean-squares are influenced by outliers and are usually easy to diagnose and remedy. *Infit* mean-squares, on the other hand, are influenced by response patterns and are harder to diagnose and remedy. Table 3.1 provides a guideline for evaluating mean-square fit statistics (Linacre & Wright, 2000).

In general, mean-squares near 1.0 indicate little distortion of the measurement system, while values less than 1.0 indicate observations are too predictable (redundancy, model overfit). Values greater than 1.0 indicate unpredictability (unmodeled noise, model underfit).

Table 3.1 Criteria to Evaluate Mean-Square Fit Statistics

Mean-Square	Interpretation
> 2.0	Distorts or degrades the measurement system
1.5 – 2.0	Unproductive for construction of measurement, but not degraded
0.5 – 1.5	Productive for measurement
< 0.5	Unproductive for measurement, but not degrading. May produce misleadingly good reliabilities and separations

3.4 Inter-Rater Reliability

Tables 4.39 through 4.44 (pages 214-219) contain information about the scoring agreement between two ratings received for each item. When the two readers assigned the same score to a student's answer, the scores were in perfect agreement. Scores differed by one score point were adjacent, and scores differing by two or more score points were in discrepancy. For further information about inter-rater agreement, please see chapter 1.6, *Scoring Procedures of the 2008 MSA-Math*. For the 2008 MSA-Math, the adjacent agreement rates were above 99%, and perfect agreement rates were above 96% for Step A and above 80% for Step B for all items across all grades.

3.5 Correlations among Mathematics Standards

The 2008 MSA-Math consisted of five subscore reporting standards: *Algebra, Geometry and Measurement, Statistics and Probability, Numbers and Computations,* and *Process*. Tables 4.3 through 4.8 (pages 161-163) contain correlation coefficients among these math standards.

3.6 Decision Accuracy and Consistency at the Cut Scores

Tables 4.9 through 4.14 (pages 164-166) contain the results of analyses performed to estimate the accuracy and consistency of the decisions for passing (proficient) on the 2008 MSA-Math. The analyses make use of the methods outlined and implemented in Livingston and Lewis (1995), Haertel (1996), and Young and Yoon (1998).

The *accuracy* of a decision is the extent to which it would agree with the decisions that would be made if each student could somehow be tested with all possible parallel forms of the assessments. The *consistency* of a decision is the extent to which it would agree with the decisions that would be made if the students had taken a different form of the examination, equal in difficulty and covering the same content as the form they actually took.

Students can be misclassified in one of two ways. Students who were below the proficiency cut score, but were classified (on the basis of the assessment) as being above a cut score, are considered to be *false positives*. Students who were above the proficiency cut score, but were classified as being below a cut score, are considered to be *false negatives*.

For the 2008 MSA-Math, Tables 4.9 through 4.14 include:

- Performance level
- Accuracy classifications
- False positives
- False negatives
- Consistency classifications

The tables illustrate the general rule that decision consistency was less than decision accuracy.

3.7 Differential Item Functioning

This section provides information about *differential item functioning* (*DIF*) analyses used for the 2008 MSA-Math. While the *reference* group was either male or Caucasian students, the *focal* group was either female or African-American students. It should be noted that DIF analyses on the 2008 operational items indicated that all the items were satisfactory. All the DIF results were archived in the 2008 Maryland item bank.

Since the 2008 MSA-Math was a mixed-format examination, comprised of *SR*, *SRP BCR, and ECR* items, the *DIF* procedure used consists of the Mantel Chi-square (Mantel, 1963) for the *BCR* and *ECR* items and the Mantel-Haenszel procedure (Mantel & Haenszel, 1959) for the *SR* and *SRP* items.

Brief Constructed Response (*BCR*) and Extended Constructed Response (*ECR*) Items

To help interpret the Mantel Chi-square (Mantel χ^2), the Educational Testing Service (ETS) *DIF* procedure uses the Mantel statistic in conjunction with the *standardized mean difference* (*SMD*).

Mantel Statistic

The Mantel χ^2 is simply a conditional mean comparison of the ordered response categories for reference and focal groups combined over values of the matching variable score. By "ordered" we mean that a response of 1 on an item is higher than 0, a response of 2 is higher than 1, and so on. "Conditional," on the other hand, refers to the comparison of members from the two groups who received the same score on the matching variable, i.e., the total test score in our analysis.

Table 3.2 shows a $2 \times T \times K$ contingency table, where T is the number of response categories and K is the number of levels of the matching variable. The values, y_1, y_2, …, y_T are the T scores that can be gained on the item. The values, n_{Ftk} and n_{Rtk}, represent the numbers of focal and reference groups who are at the k^{th} level of the matching variable and gain an item score of y_t. The "+" indicates total number over a particular index (Zwick, Donoghue, & Grima, 1993).

Table 3.2 $2 \times T$ Contingency Table at the k^{th} level

Group	Item Score				Total
	y_1	y_2		y_T	
Reference	n_{R1k}	n_{R2k}	…	n_{RTk}	n_{R+k}
Focal	n_{F1k}	n_{F2k}	…	n_{FTk}	n_{F+k}
Total	n_{+1k}	n_{+2k}	…	n_{+Tk}	n_{++k}

Note. This table was cited from Zwick, et al. (1993)

The Mantel statistic is defined as the following formula:

$$\text{Mantel } \chi^2 = \frac{(\sum_k F_k - \sum_k E(F_k))^2}{\sum_k Var(F_k)}$$

where

F_k = the sum of scores for the focal group at the k^{th} level of the matching variable and is defined as follows:

$F_k = \sum_t y_t n_{Ftk}$,

The expectation of F_k under the null hypothesis is

$$E(F_k) = \frac{n_{F+k}}{n_{++k}} \sum_t y_t n_{+tk} .$$

And, the variance of F_k under the null hypothesis is as follows:

$$Var(F_k) = \frac{n_{R+k} n_{F+k}}{n_{++k}^2 (n_{++k} - 1)} \left[(n_{++k} \sum_t y_t^2 n_{+tk}) - (\sum_t y_t n_{+tk})^2 \right].$$

Under H_0, the Mantel statistic has a chi-square distribution with one degree of freedom. In *DIF* applications, rejecting H_0 suggests that the students of the reference and focal groups who are similar in overall test performance tend to differ in their mean performance. In the case of dichotomous items, on the other hand, the statistic is identical to the Mantel-Haenszel (1959) statistic without the continuity correction (Zwick, Donoghue, & Grima, 1993).

Standardized Mean Difference (SMD)

A summary statistic to accompany the Mantel approach is the *standardized mean difference* (*SMD*) between the reference and focal groups proposed by Dorans and Schmitt (1991). This statistic compares the means of the reference and focal groups, adjusting for differences in the distribution of the reference and focal group members across the values of the matching variable.

$$SMD = \sum_k p_{Fk} m_{Fk} - \sum_k p_{Fk} m_{Rk}$$

where

$p_{Fk} = \frac{n_{F+k}}{n_{F++}}$, the proportion of the focal group members who are at the k^{th} level of the matching variable,

$m_{RK} = \frac{1}{n_{F+k}} \times (\sum_t y_t n_{Ftk})$, the mean item score of the focal group members at the k^{th} level, and

m_{Rk} = the analogous value for the reference group.

As can be seen from the equation above, the *SMD* is the difference between the unweighted item mean of the focal group and the weighted item mean of the reference group. The weights for the reference group are applied to make the weighted number of the reference group students the same as in the focal group within the same ability. A negative *SMD* value implies that the focal group has a lower mean item score than the reference group, conditional on the matching variable.

DIF classification for *BCR* and *ECR* items

The *SMD* is divided by the total group item standard deviation to obtain an effect-size value for the *SMD*. This effect-size *SMD* is then examined in conjunction with the Mantel χ^2 to obtain *DIF* classifications that are depicted in Table 3.3 below.

Table 3.3 *DIF* Classification for *BCR* and *ECR* Items

Category	Description	Criterion
AA	No *DIF*	Non-significant Mantel χ^2 or Significant Mantel χ^2 and |SMD/SD| ≤ .17
BB	Weak *DIF*	Significant Mantel χ^2 and .17 < |SMD/SD| ≤ .25
CC	Strong *DIF*	Significant Mantel χ^2 and .25 < |SMD/SD|

Note. SD is the total group standard deviation of the item score in its original metric.

Selected Response (*SR*) and Student-Produced Response (*SPR*) Items

For the *SR* and *SPR* items, the Mantel-Haenszel Chi-square (M-H χ^2) is used in conjunction with the M-H odds ratio transferred to what ETS calls the *delta scale* (D).

The Odds Ratio

The odds of a correct response are *P/Q* or *P/(1-P)*. The odds ratio, on the other hand, is simply the odds of a correct response of the reference group divided by the odds of a correct response of the focal group.

For a given item, the odds ratio is defined as follows:

$$\alpha_{M-H} = \frac{P_r / Q_r}{P_f / Qf}.$$

The corresponding null hypothesis is that the odds of getting the item correct are equal for the two groups. Thus, the odds ratio is equal to 1:

$$H_0\colon \alpha_{M-H} = \frac{P_r / Q_r}{P_f / Qf} = 1.$$

The Delta Scale

In order to make the odds ratio symmetrical around zero with its range being in the interval $-\infty$ to $+\infty$, the odds ratio is transformed into a log odds ratio as per the following:

$$\beta_{M-H} = \ln(\alpha_{\text{M-H}}).$$

The simple natural logarithm transformation of this odds ratio is symmetrical about zero in which zero has the interpretation of equal odds. This *DIF* measure is a signed index where a positive value signifies *DIF* in favor of the reference group while a negative value indicates *DIF* in favor of the focal group. β_{M-H} also has the advantage of being transformed linearly to other interval scale metrics (Camilli & Shepard, 1994). This fact is utilized by ETS in creating their delta scale (D), which is defined as follows:

$$\text{D} = -2.35 \cdot \beta_{M-H}.$$

DIF classification for *SR* and *SPR* items

The following table depicts *DIF* classifications for SR items to examine the M-H χ^2 in conjunction with the delta scale (D):

Table 3.4 *DIF* Classification for *SR* and *SPR* Items

Category	Description	Criterion
A	No *DIF*	Non-significant M-H χ^2 or $\lvert D\rvert < 1.0$
C	Strong *DIF*	Significant M-H χ^2 and $\lvert D\rvert \geq 1.5$
B	Weak *DIF*	Otherwise classified as B

3.8 Equating and Scaling

Tables 4.15 through 4.38 contain the 2008 MSA-Math total and subtotal raw score to scale score (RS/SS) conversion tables. Conditional standard errors for the total and subtotal scale scores are also included.

The Rasch and Partial Credit Models

The most basic expression of the Rasch model is in the *item characteristic curve* (ICC). It shows the probability of a correct response to an item as a function of the ability level. The probability of a correct response is bounded by 1 (certainty of a correct response) and 0 (certainty of an incorrect response).

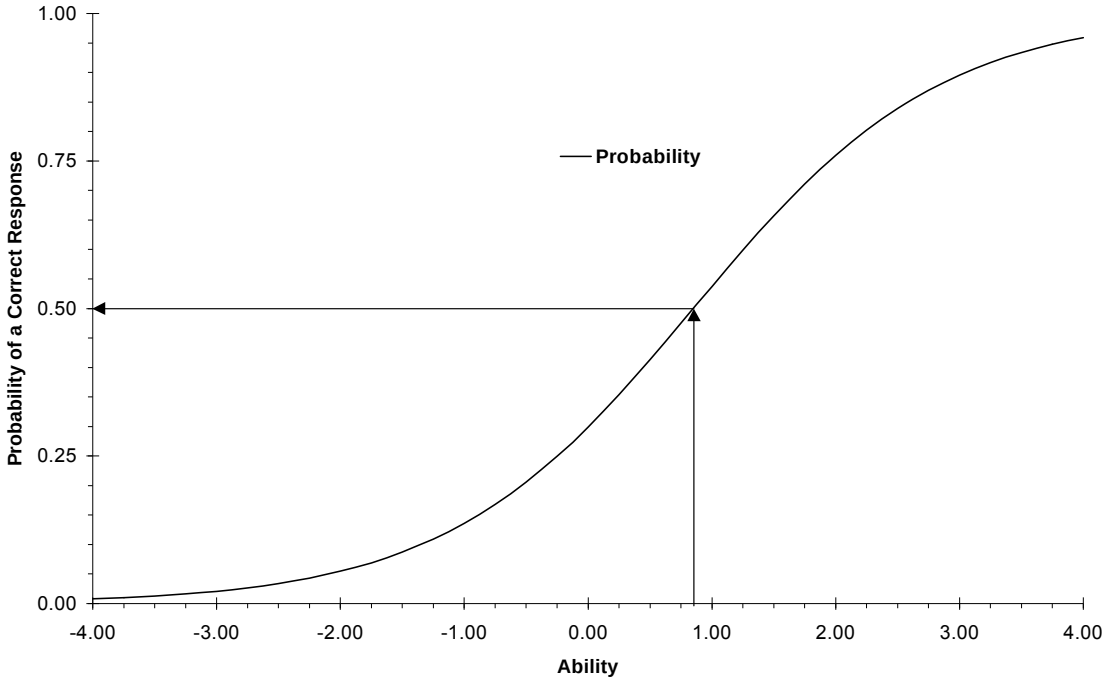
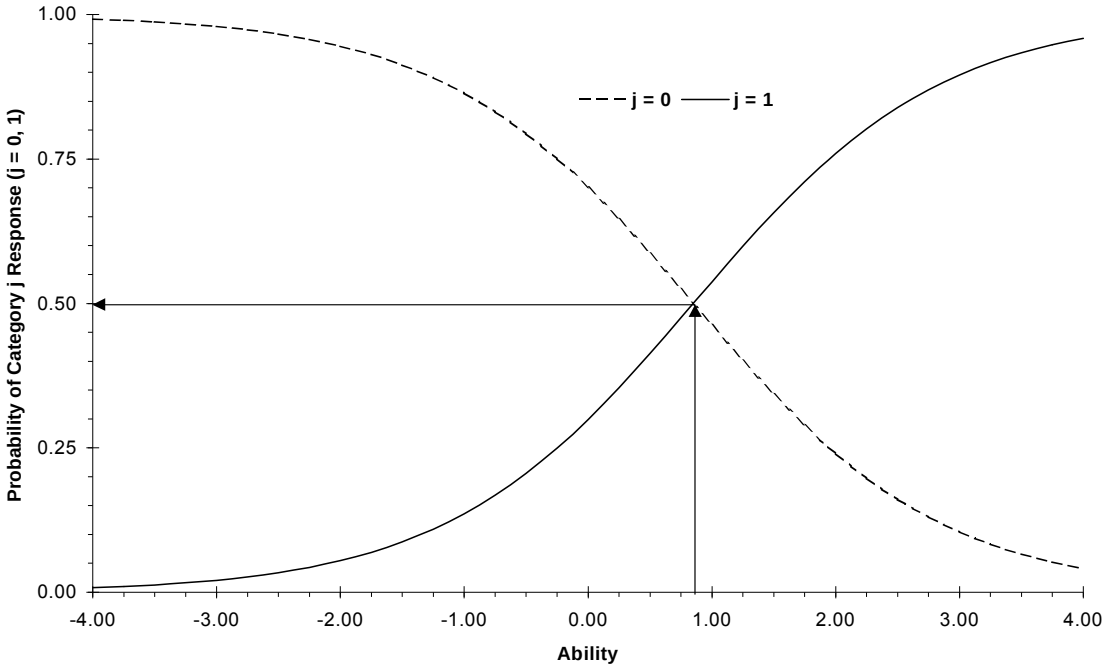


Figure 3.1 Item Characteristic Curve

As an example, consider Figure 3.1 which depicts an item that falls at approximately 0.85 on the ability (horizontal) scale. When a person answers an item at the same level as their ability, then that person has a probability of roughly 50% of answering the item correctly. Another way of expressing this is that if we have a group of 100 people, all of whom have an ability of 0.85, we would expect about 50% of them to answer the item correctly. A person whose ability was above 0.85 would a higher probability of getting the item right, while a person whose ability is below 0.85 would have a lower probability of getting the item right. This makes intuitive sense and is the basic formulation of Rasch measurement for test items having only 2 possible categories (i.e., wrong or right).



Figugure 3.2 Category Response Curves for a One-Step Item

Figure 3.2 extends this formulation to show the probabilities of obtaining a wrong answer or a right answer. The curve on the left ($j = 0$) shows the probability of getting a score of "0" while the curve on the right ($j = 1$) shows the probability of getting a score of "1". The point at which the two curves cross indicates the transition point on the ability scale where the most likely response changes from a "0" to a "1". Here, the probability of answering the item correctly is 50%.

The key step in the formulation, and the point at which the Rasch dichotomous model merges with the PCM, requires us to assume an additional response category. Suppose that, rather than scoring items as completely wrong or completely right, we add a category representing answers that, though not totally correct, are still clearly not totally incorrect. These relationships are shown in Figure 3.3.

The left-most curve ($j = 0$) in Figure 3.3 represents the probability for all examinees getting a score of "0" (completely incorrect) on the item, given their ability. Those of very low ability (i.e., below – 2) are very likely to be in this category and, in fact, are more likely to be in this category than the other two. Those receiving a "1" (partial credit) tend to fall in the middle range of abilities (the middle curve, $j = 1$). The final, right-most curve ($j = 2$) represents the probability for those receiving scores of "2" (completely correct). Very high-ability people are clearly more likely to be in this category than in any other, but there are still some of average and low ability that can get full credit for the item.

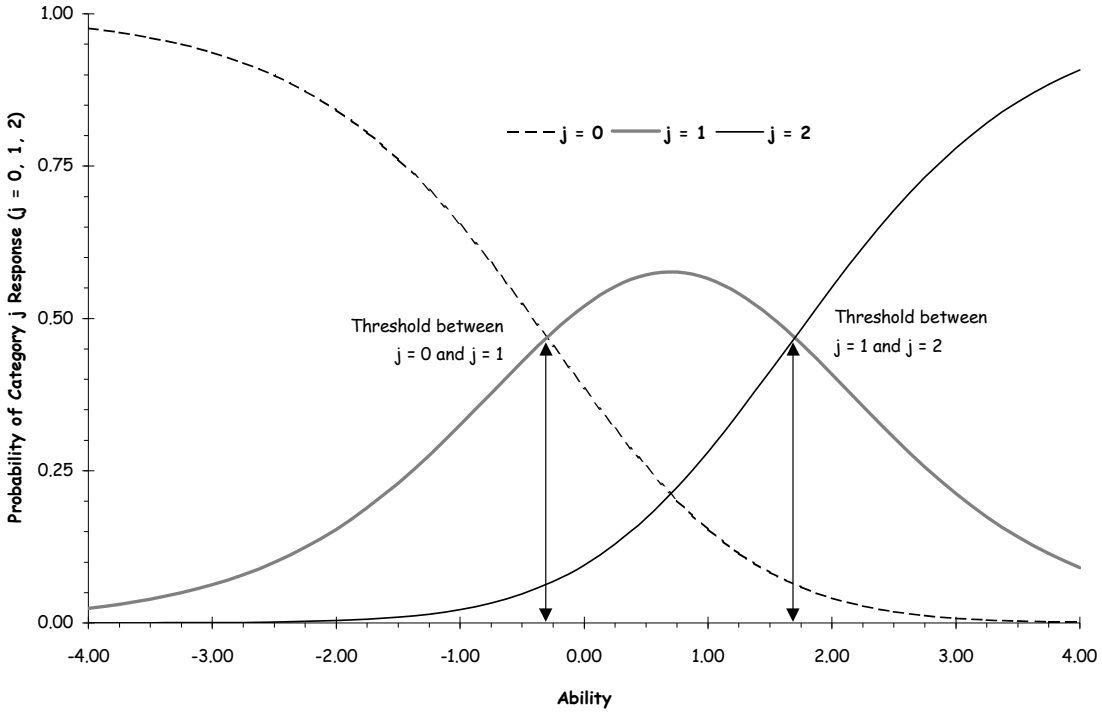


Figure 3.3 Category Response Curves for a Two-Step Item

Although the actual computations are quite complex, the points at which lines cross each other have a similar interpretation as for the dichotomous case. Consider the point at which the $j = 0$ line crosses the $j = 1$ line, indicated by the left arrow. For abilities to the left of (or less than) this point, the probability is greatest for a "0" response. To the right of (or above) this point, and up to the point at which the $j = 1$ and $j = 2$ lines cross (marked by the right arrow), the most likely response is a "1". For abilities to the right of this point, the most likely response is a "2".

Note that the probability of scoring a "1" response ($j = 1$) declines in both directions as ability decreases to the low extreme or increases to the high extreme. These points then may be thought of as the difficulties of crossing the *thresholds* between categories.

An important implication of the formulation can be summarized as follows: If the commonly used Rasch model applied to dichotomously (right/wrong) scored items can be thought of as simply a

special case of the PCM, then the act of scaling multiple-choice items together with polytomous items, whether they have three or more response categories, is a straightforward process of applying the measurement model. The quality of the scaling can then be assessed in terms of known procedures.

One important property of the PCM is its ability to separate the estimation of item/task parameters from the person parameters. With the PCM, as with the Rasch model, the total score given by the sum of the categories in which a person responds is a sufficient statistic for estimating person ability (i.e., no additional information need be estimated). The total number of responses across examinees in a particular category is a sufficient statistic for estimating the step difficulty for that category. Thus with PCM, the same total score will yield the same ability estimate for different examinees.

The PCM is a direct extension of the dichotomous one-parameter logistic *IRT* model developed by Rasch (Rasch, 1980). For an item/task involving m_i score categories, one general expression for the probability of scoring x on item/task i is given by

$$P_{nix} = \exp\sum_{j=0}^{x}\left(\theta_n - D_{ij}\right) / \sum_{k=0}^{m_i}\left[\exp\sum_{j=0}^{k}\left(\theta_n - D_{ij}\right)\right] \qquad x = 0, 1, ..., m_i,$$

where $\sum_{j=0}^{0}\left(\theta - D_{ij}\right) = 0$ and

$$\exp\sum_{j=0}^{0}\left(\theta - D_{ij}\right) = 1.$$

The above equation gives the probability of scoring x on the i-th test item as a function of ability (θ) and the difficulty of the m_i steps of the task (Masters, 1982).

According to this model, the probability of an examinee scoring in a particular category (step) is the sum of the logit (log-odds) differences between θ and D_{ij} of all the completed steps, divided by the sum of the differences of all the steps of a task. Thissen and Steinberg (1986) refers to this model as a divide-by-total model. The parameters estimated by this model are (1) an ability estimate for each person (or ability estimate at each raw score level) and (2) m_i threshold (difficulty) estimates for each task with $m_i + 1$ score categories.

4. THE 2008 MSA-MATH STATISTICAL SUMMARY

Table 4.1 The 2008 MSA-Math Classical Descriptive Statistics: Grades 3 through 8

Grade	Form	No. of Items	*N*	*M*	*SD*	Reliability	*SEM*
3	A	65	29,364	50.02	12.47	0.93	3.30
	F	65	29,253	52.00	11.88	0.93	3.14
4	A	64	30,101	48.54	12.91	0.94	3.16
	F	64	29,933	50.40	13.06	0.94	3.20
5	A	65	30,537	46.84	14.23	0.94	3.49
	F	65	30,289	47.04	14.31	0.94	3.51
6	A	62	31,060	44.03	15.18	0.95	3.39
	F	62	30,292	44.91	14.65	0.95	3.28
7	A	62	31,804	38.19	16.18	0.95	3.62
	F	62	31,048	41.28	16.17	0.96	3.23
8	A	62	32,318	35.64	16.68	0.95	3.73
	F	62	31,743	38.02	16.74	0.96	3.35

Note. Analysis was conducted with a statewide population.

Table 4.2 The 2008 MSA-Math Scale Score Descriptive Statistics: Grades 3 through 8

Grade	Form	*N*	*M*	*SD*	*P10*	*Q1*	*Mdn*	*Q3*	*P90*	*IQR*	*SE* at Cut-Points	
											Prof.	Adv.
3	A	29,364	414.4	39.9	363	387	414	443	462	56	9	12
	F	29,253	418.4	41.4	366	390	420	445	470	55	9	13
	Overall	58,617	416.4	40.7	363	389	417	443	469	54	N/A	N/A
4	A	30,101	424.6	42.9	370	395	425	454	481	59	9	11
	F	29,933	425.1	43.4	370	395	424	454	478	59	9	11
	Overall	60,034	424.9	43.2	370	395	424	454	481	59	N/A	N/A
5	A	30,537	425.3	38.6	377	399	424	450	477	51	8	10
	F	30,289	427.3	39.5	378	398	425	455	479	57	8	10
	Overall	60,826	426.3	39.0	377	399	425	453	477	54	N/A	N/A
6	A	31,060	425.2	40.0	374	395	422	453	477	58	8	9
	F	30,292	427.4	39.8	377	399	427	454	479	55	8	9
	Overall	61,352	426.3	39.9	376	397	425	454	479	57	N/A	N/A
7	A	31,804	416.3	40.8	365	386	414	446	470	60	8	9
	F	31,048	417.8	41.5	364	388	417	447	473	59	8	10
	Overall	62,852	417.1	41.2	364	386	416	446	473	60	N/A	N/A
8	A	32,318	421.1	38.0	373	393	418	447	474	54	8	8
	F	31,743	423.2	39.7	374	394	420	451	478	57	8	8
	Overall	64,061	422.1	38.9	374	393	420	449	474	56	N/A	N/A

Note. Analysis was conducted with a statewide population.

Table 4.3 The 2008 MSA-Math Standard Correlations: Grade 3

Form	N	Mean	SD	1	2	3	4	5
Form A								
1. Algebra	29,364	9.73	2.65	1.00				
2. Geometry and Measurement	29,364	10.90	2.73	0.69	1.00			
3. Statistics and Probability	29,364	10.35	2.89	0.74	0.69	1.00		
4. Numbers and Computation	29,364	11.72	3.27	0.76	0.71	0.75	1.00	
5. Process	29,364	7.31	2.81	0.64	0.64	0.64	0.67	1.00
Form F								
1. Algebra	29,253	10.42	2.45	1.00				
2. Geometry and Measurement	29,253	11.34	2.68	0.68	1.00			
3. Statistics and Probability	29,253	10.48	2.82	0.73	0.68	1.00		
4. Numbers and Computation	29,253	12.42	3.14	0.76	0.71	0.75	1.00	
5. Process	29,253	7.35	2.53	0.64	0.67	0.67	0.69	1.00

Note. Analysis was conducted with a statewide population.

Table 4.4 The 2008 MSA-Math Standard Correlations: Grade 4

Form	N	Mean	SD	1	2	3	4	5
Form A								
1. Algebra	30,101	10.96	2.69	1.00				
2. Geometry and Measurement	30,101	9.66	2.80	0.68	1.00			
3. Statistics and Probability	30,101	10.89	3.47	0.74	0.72	1.00		
4. Numbers and Computation	30,101	9.93	2.88	0.72	0.71	0.75	1.00	
5. Process	30,101	7.10	2.84	0.69	0.70	0.73	0.71	1.00
Form F								
1. Algebra	29,933	10.93	2.81	1.00				
2. Geometry and Measurement	29,933	9.44	2.90	0.69	1.00			
3. Statistics and Probability	29,933	11.11	3.33	0.75	0.71	1.00		
4. Numbers and Computation	29,933	11.01	2.71	0.73	0.69	0.73	1.00	
5. Process	29,933	7.91	3.08	0.72	0.70	0.77	0.69	1.00

Note. Analysis was conducted with a statewide population.

Table 4.5 The 2008 MSA-Math Standard Correlations: Grade 5

Form	N	Mean	SD	1	2	3	4	5
Form A								
1. Algebra	30,537	10.87	2.97	1.00				
2. Geometry and Measurement	30,537	7.98	3.27	0.71	1.00			
3. Statistics and Probability	30,537	9.63	2.83	0.72	0.71	1.00		
4. Numbers and Computation	30,537	10.24	3.33	0.73	0.74	0.74	1.00	
5. Process	30,537	8.12	3.66	0.73	0.74	0.73	0.76	1.00
Form F								
1. Algebra	30,289	11.15	2.93	1.00				
2. Geometry and Measurement	30,289	7.73	3.31	0.70	1.00			
3. Statistics and Probability	30,289	9.81	2.81	0.73	0.70	1.00		
4. Numbers and Computation	30,289	10.07	3.50	0.73	0.74	0.74	1.00	
5. Process	30,289	8.28	3.59	0.73	0.75	0.72	0.77	1.00

Note. Analysis was conducted with a statewide population.

Table 4.6 The 2008 MSA-Math Standard Correlations: Grade 6

Form	N	Mean	SD	1	2	3	4	5
Form A								
1. Algebra	31,060	9.56	3.15	1.00				
2. Geometry and Measurement	31,060	8.39	3.48	0.77	1.00			
3. Statistics and Probability	31,060	8.87	3.01	0.76	0.74	1.00		
4. Numbers and Computation	31,060	8.63	3.52	0.78	0.77	0.76	1.00	
5. Process	31,060	8.58	3.61	0.79	0.79	0.78	0.80	1.00
Form F								
1. Algebra	30,292	9.90	3.13	1.00				
2. Geometry and Measurement	30,292	8.74	3.20	0.75	1.00			
3. Statistics and Probability	30,292	9.33	2.90	0.75	0.71	1.00		
4. Numbers and Computation	30,292	8.76	3.48	0.78	0.75	0.74	1.00	
5. Process	30,292	8.18	3.55	0.80	0.79	0.76	0.79	1.00

Note. Analysis was conducted with a statewide population.

Table 4.7 The 2008 MSA-Math Standard Correlations: Grade 7

Form	N	Mean	SD	1	2	3	4	5
Form A								
1. Algebra	31,804	7.59	3.45	1.00				
2. Geometry and Measurement	31,804	6.29	3.45	0.78	1.00			
3. Statistics and Probability	31,804	8.79	3.79	0.78	0.77	1.00		
4. Numbers and Computation	31,804	8.02	3.47	0.80	0.77	0.78	1.00	
5. Process	31,804	7.50	3.63	0.79	0.80	0.82	0.77	1.00
Form F								
1. Algebra	31,048	8.18	3.36	1.00				
2. Geometry and Measurement	31,048	6.61	3.69	0.78	1.00			
3. Statistics and Probability	31,048	9.18	3.73	0.77	0.77	1.00		
4. Numbers and Computation	31,048	8.02	3.54	0.80	0.80	0.78	1.00	
5. Process	31,048	9.29	3.49	0.76	0.75	0.84	0.74	1.00

Note. Analysis was conducted with a statewide population.

Table 4.8 The 2008 MSA-Math Standard Correlations: Grade 8

Form	N	Mean	SD	1	2	3	4	5
Form A								
1. Algebra	32,318	6.92	3.92	1.00				
2. Geometry and Measurement	32,318	6.13	3.28	0.76	1.00			
3. Statistics and Probability	32,318	7.05	3.46	0.76	0.74	1.00		
4. Numbers and Computation	32,318	5.85	2.94	0.78	0.75	0.75	1.00	
5. Process	32,318	9.69	4.81	0.83	0.77	0.81	0.76	1.00
Form F								
1. Algebra	31,743	7.34	3.87	1.00				
2. Geometry and Measurement	31,743	6.39	3.30	0.76	1.00			
3. Statistics and Probability	31,743	7.84	3.58	0.77	0.75	1.00		
4. Numbers and Computation	31,743	6.32	3.07	0.79	0.75	0.76	1.00	
5. Process	31,743	10.14	4.61	0.83	0.78	0.82	0.76	1.00

Note. Analysis was conducted with a statewide population.

Table 4.9 The 2008 MSA-Math Decision Accuracy and Consistency Indices: Grade 3

Form	Performance Cut	Accuracy	False Positive	False Negative	Consistency
A	*B : PA*	0.94	0.03	0.03	0.92
	BP : A	0.93	0.04	0.03	0.90
F	*B : PA*	0.94	0.03	0.03	0.92
	BP : A	0.93	0.04	0.03	0.90

Note. B: PA denotes the cut between Basic and Proficient, while BP:A denotes the cut between Proficient and Advanced.

Table 4.10 The 2008 MSA- Mathematics Decision Accuracy and Consistency Indices: Grade 4

Form	Performance Cut	Accuracy	False Positive	False Negative	Consistency
A	*B : PA*	0.95	0.02	0.03	0.93
	BP : A	0.93	0.04	0.04	0.90
F	*B : PA*	0.95	0.02	0.03	0.93
	BP : A	0.93	0.04	0.04	0.90

Note. B: PA denotes the cut between Basic and Proficient, while BP:A denotes the cut between Proficient and Advanced.

Table 4.11 The 2008 MSA- Mathematics Decision Accuracy and Consistency Indices: Grade 5

Form	Performance Cut	Accuracy	False Positive	False Negative	Consistency
A	*B : PA*	0.94	0.02	0.03	0.92
	BP : A	0.94	0.03	0.03	0.92
F	*B : PA*	0.94	0.03	0.03	0.92
	BP : A	0.94	0.03	0.03	0.92

Note. B: PA denotes the cut between Basic and Proficient, while BP:A denotes the cut between Proficient and Advanced.

Table 4.12 The 2008 MSA- Mathematics Decision Accuracy and Consistency Indices: Grade 6

Form	Performance Cut	Accuracy	False Positive	False Negative	Consistency
A	*B : PA*	0.94	0.03	0.03	0.92
	BP : A	0.94	0.03	0.03	0.92
F	*B : PA*	0.94	0.03	0.04	0.91
	BP : A	0.94	0.03	0.03	0.92

Note. B: PA denotes the cut between Basic and Proficient, while BP:A denotes the cut between Proficient and Advanced.

Table 4.13 The 2008 MSA- Mathematics Decision Accuracy and Consistency Indices: Grade 7

Form	Performance Cut	Accuracy	False Positive	False Negative	Consistency
A	*B : PA*	0.94	0.03	0.03	0.91
	BP : A	0.95	0.03	0.02	0.93
F	*B : PA*	0.94	0.03	0.03	0.92
	BP : A	0.95	0.03	0.02	0.94

Note. B: PA denotes the cut between Basic and Proficient, while BP:A denotes the cut between Proficient and Advanced.

Table 4.14 The 2008 MSA- Mathematics Decision Accuracy and Consistency Indices: Grade 8

Form	Performance Cut	Accuracy	False Positive	False Negative	Consistency
A	*B : PA*	0.93	0.03	0.04	0.91
	BP : A	0.95	0.03	0.02	0.92
F	*B : PA*	0.93	0.03	0.03	0.91
	BP : A	0.95	0.03	0.02	0.93

Note. B: PA denotes the cut between Basic and Proficient, while BP:A denotes the cut between Proficient and Advanced.

Table 4.15 The 2008 MSA-Math Total Raw Score to Scale Score Conversion Table: Grade 3 Form A

	Form A			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
0	240[a]	47	240[a]	240[a]
1	240[a]	33	240[a]	248
2	240[a]	24	240[a]	263
3	254	20	240[a]	274
4	264	17	247	281
5	272	16	256	288
6	279	15	264	294
7	285	14	271	299
8	291	13	278	304
9	296	12	284	308
10	300	12	288	312
11	304	11	293	315
12	308	11	297	319
13	312	11	301	323
14	315	10	305	325
15	318	10	308	328
16	321	10	311	331
17	325	10	315	335
18	327	10	317	337
19	330	10	320	340
20	333	9	324	342
21	336	9	327	345
22	338	9	329	347
23	341	9	332	350
24	344	9	335	353
25	346	9	337	355
26	349	9	340	358
27	351	9	342	360
28	353	9	344	362
29	356	9	347	365
30	358	9	349	367
31	361	9	352	370
32	363	9	354	372
33	365	9	356	374
34	368	9	359	377
35	370	9	361	379
36	372	9	363	381
37	375	9	366	384
38	377	9	368	386
39	380	9	371	389
40	382	9	373	391
41	384	9	375	393
42	387	9	378	396
43	389	9	380	398
44	392	9	383	401
45	395	9	386	404

Table 4.15 (continued)

Form A				
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
46	397	9	388	406
47	400	9	391	409
48	403	9	394	412
49	405	10	395	415
50	408	10	398	418
51	411	10	401	421
52	414	10	404	424
53	417	10	407	427
54	420	10	410	430
55	424	10	414	434
56	427	11	416	438
57	431	11	420	442
58	434	11	423	445
59	438	12	426	450
60	443	12	431	455
61	447	12	435	459
62	452	13	439	465
63	457	13	444	470
64	462	14	448	476
65	469	15	454	484
66	476	16	460	492
67	483	17	466	500
68	493	18	475	511
69	504	21	483	525
70	520	25	495	545
71	545	34	511	579
72	568	47	521	615

Note. [a]LOSS was set to 240.

Table 4.16 The 2008 Total MSA-Math Total Raw Score to Scale Score Conversion Table: Grade 3 Form F

	Form F			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
0	240[a]	47	240[a]	240[a]
1	240[a]	34	240[a]	242
2	240[a]	24	240[a]	256
3	247	20	240[a]	267
4	257	18	240[a]	275
5	266	16	250	282
6	273	15	258	288
7	280	14	266	294
8	285	13	272	298
9	290	13	277	303
10	295	12	283	307
11	299	12	287	311
12	303	11	292	314
13	307	11	296	318
14	310	11	299	321
15	314	10	304	324
16	317	10	307	327
17	320	10	310	330
18	323	10	313	333
19	326	10	316	336
20	328	10	318	338
21	331	9	322	340
22	334	9	325	343
23	337	9	328	346
24	339	9	330	348
25	342	9	333	351
26	344	9	335	353
27	347	9	338	356
28	349	9	340	358
29	351	9	342	360
30	354	9	345	363
31	356	9	347	365
32	359	9	350	368
33	361	9	352	370
34	363	9	354	372
35	366	9	357	375
36	368	9	359	377
37	370	9	361	379
38	373	9	364	382
39	375	9	366	384
40	378	9	369	387
41	380	9	371	389
42	383	9	374	392
43	385	9	376	394
44	388	9	379	397
45	390	9	381	399

Table 4.16 (continued)

Form F				
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
46	393	9	384	402
47	396	9	387	405
48	398	10	388	408
49	401	10	391	411
50	404	10	394	414
51	407	10	397	417
52	410	10	400	420
53	413	10	403	423
54	417	11	406	428
55	420	11	409	431
56	424	11	413	435
57	428	11	417	439
58	432	12	420	444
59	436	12	424	448
60	440	12	428	452
61	445	13	432	458
62	451	13	438	464
63	456	14	442	470
64	463	15	448	478
65	470	16	454	486
66	478	17	461	495
67	488	18	470	506
68	499	20	479	519
69	513	23	490	536
70	531	27	504	558
71	559	35	524	594
72	585	48	537	633

Note. [a]LOSS was set to 240.

Table 4.17 The 2008 MSA-Math Subtotal Raw Score to Scale Score Conversion Table: Grade 3 Form A

		Form A			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
AL	0	247	48	240[a]	295
AL	1	272	35	240[a]	307
AL	2	300	26	274	326
AL	3	318	23	295	341
AL	4	333	21	312	354
AL	5	346	20	326	366
AL	6	358	20	338	378
AL	7	370	20	350	390
AL	8	383	21	362	404
AL	9	396	22	374	418
AL	10	412	24	388	436
AL	11	431	27	404	458
AL	12	461	36	425	497
AL	13	487	49	438	536
GM	0	240[a]	49	240[a]	283
GM	1	260	36	240[a]	296
GM	2	289	27	262	316
GM	3	308	23	285	331
GM	4	323	21	302	344
GM	5	336	20	316	356
GM	6	348	19	329	367
GM	7	359	19	340	378
GM	8	370	19	351	389
GM	9	382	19	363	401
GM	10	393	20	373	413
GM	11	406	21	385	427
GM	12	421	23	398	444
GM	13	439	26	413	465
GM	14	467	35	432	502
GM	15	492	48	444	540
SP	0	249	48	240[a]	297
SP	1	274	35	240[a]	309
SP	2	300	26	274	326
SP	3	318	22	296	340
SP	4	332	21	311	353
SP	5	344	20	324	364
SP	6	356	19	337	375
SP	7	367	19	348	386
SP	8	378	19	359	397
SP	9	390	20	370	410
SP	10	402	21	381	423
SP	11	416	23	393	439
SP	12	434	26	408	460
SP	13	461	35	426	496
SP	14	486	48	438	534
NC	0	244	47	240[a]	291
NC	1	269	34	240[a]	303
NC	2	295	26	269	321

Table 4.17 (continued)

Form A					
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
NC	3	312	22	290	334
NC	4	325	20	305	345
NC	5	337	19	318	356
NC	6	347	18	329	365
NC	7	358	18	340	376
NC	8	367	18	349	385
NC	9	378	18	360	396
NC	10	388	19	369	407
NC	11	399	19	380	418
NC	12	411	21	390	432
NC	13	426	23	403	449
NC	14	444	26	418	470
NC	15	471	35	436	506
NC	16	496	48	448	544
PR	0	267	48	240[a]	315
PR	1	293	36	257	329
PR	2	323	28	295	351
PR	3	344	25	319	369
PR	4	362	24	338	386
PR	5	378	23	355	401
PR	6	394	23	371	417
PR	7	410	23	387	433
PR	8	425	23	402	448
PR	9	441	23	418	464
PR	10	457	23	434	480
PR	11	475	25	450	500
PR	12	496	28	468	524
PR	13	525	36	489	561
PR	14	551	48	503	599

Note. [a]LOSS was set to 240.

Note. AL=Algebra, GM=Geometry and Measurement, SP=Statistics and Probability, NC=Numbers and Computation, PR=Process.

Table 4.18 The 2008 MSA-Math Subtotal Raw Score to Scale Score Conversion Table: Grade 3 Form F

		Form F			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
AL	0	240[a]	50	240[a]	274
AL	1	252	37	240[a]	289
AL	2	283	28	255	311
AL	3	304	24	280	328
AL	4	320	22	298	342
AL	5	334	21	313	355
AL	6	347	20	327	367
AL	7	360	20	340	380
AL	8	373	21	352	394
AL	9	386	22	364	408
AL	10	401	23	378	424
AL	11	420	27	393	447
AL	12	449	35	414	484
AL	13	474	48	426	522
GM	0	240[a]	49	240[a]	282
GM	1	259	36	240[a]	295
GM	2	288	27	261	315
GM	3	307	23	284	330
GM	4	322	21	301	343
GM	5	335	20	315	355
GM	6	347	19	328	366
GM	7	358	19	339	377
GM	8	369	19	350	388
GM	9	380	19	361	399
GM	10	392	20	372	412
GM	11	404	21	383	425
GM	12	418	23	395	441
GM	13	436	26	410	462
GM	14	463	35	428	498
GM	15	488	48	440	536
SP	0	248	48	240[a]	296
SP	1	272	35	240[a]	307
SP	2	300	26	274	326
SP	3	317	23	294	340
SP	4	332	21	311	353
SP	5	345	20	325	365
SP	6	356	19	337	375
SP	7	368	19	349	387
SP	8	379	19	360	398
SP	9	391	20	371	411
SP	10	403	21	382	424
SP	11	417	23	394	440
SP	12	435	26	409	461
SP	13	462	35	427	497
SP	14	487	48	439	535
NC	0	240	47	240[a]	287
NC	1	265	34	240[a]	299
NC	2	290	25	265	315

Table 4.18 (continued)

Form F					
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
NC	3	307	22	285	329
NC	4	320	20	300	340
NC	5	331	19	312	350
NC	6	341	18	323	359
NC	7	351	18	333	369
NC	8	360	18	342	378
NC	9	370	18	352	388
NC	10	380	19	361	399
NC	11	391	19	372	410
NC	12	403	21	382	424
NC	13	418	23	395	441
NC	14	436	27	409	463
NC	15	464	35	429	499
NC	16	489	48	441	537
PR	0	265	48	240[a]	313
PR	1	291	36	255	327
PR	2	320	28	292	348
PR	3	341	25	316	366
PR	4	358	24	334	382
PR	5	375	23	352	398
PR	6	392	24	368	416
PR	7	410	25	385	435
PR	8	429	25	404	454
PR	9	449	26	423	475
PR	10	469	26	443	495
PR	11	491	27	464	518
PR	12	515	30	485	545
PR	13	549	37	512	586
PR	14	576	49	527	625

Note. [a]LOSS was set to 240.

AL=Algebra, GM=Geometry and Measurement, SP=Statistics and Probability, NC=Numbers and Computation, PR=Process.

Table 4.19 The 2008 MSA-Math Total Raw Score to Scale Score Conversion Table: Grade 4 Form A

	Form A			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
0	240[a]	47	240[a]	242
1	240[a]	34	240[a]	253
2	244	25	240[a]	269
3	259	20	240[a]	279
4	270	18	252	288
5	279	16	263	295
6	286	15	271	301
7	293	14	279	307
8	298	13	285	311
9	304	13	291	317
10	308	12	296	320
11	313	12	301	325
12	317	11	306	328
13	321	11	310	332
14	324	11	313	335
15	328	11	317	339
16	331	10	321	341
17	335	10	325	345
18	338	10	328	348
19	341	10	331	351
20	344	10	334	354
21	346	10	336	356
22	349	10	339	359
23	352	9	343	361
24	355	9	346	364
25	357	9	348	366
26	360	9	351	369
27	363	9	354	372
28	365	9	356	374
29	368	9	359	377
30	370	9	361	379
31	373	9	364	382
32	375	9	366	384
33	378	9	369	387
34	380	9	371	389
35	383	9	374	392
36	385	9	376	394
37	387	9	378	396
38	390	9	381	399
39	392	9	383	401
40	395	9	386	404
41	398	9	389	407
42	400	9	391	409
43	403	9	394	412
44	405	9	396	414
45	408	9	399	417

Table 4.19 (continued)

Form A				
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
46	411	10	401	421
47	414	10	404	424
48	416	10	406	426
49	419	10	409	429
50	422	10	412	432
51	425	10	415	435
52	428	10	418	438
53	432	10	422	442
54	435	11	424	446
55	439	11	428	450
56	442	11	431	453
57	446	11	435	457
58	450	12	438	462
59	454	12	442	466
60	459	12	447	471
61	464	13	451	477
62	469	13	456	482
63	475	14	461	489
64	481	15	466	496
65	489	16	473	505
66	497	17	480	514
67	507	19	488	526
68	519	21	498	540
69	535	25	510	560
70	560	34	526	594
71	584	48	536	632

Note. [a]LOSS was set to 240.

Table 4.20 The 2008 MSA-Math Total Raw Score to Scale Score Conversion Table: Grade 4 Form F

	Form F			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
0	240[a]	48	240[a]	241
1	240[a]	34	240[a]	251
2	243	25	240[a]	268
3	258	21	240[a]	279
4	269	18	251	287
5	278	16	262	294
6	286	15	271	301
7	293	14	279	307
8	298	13	285	311
9	303	13	290	316
10	308	12	296	320
11	313	12	301	325
12	317	11	306	328
13	320	11	309	331
14	324	11	313	335
15	328	10	318	338
16	331	10	321	341
17	334	10	324	344
18	337	10	327	347
19	340	10	330	350
20	343	10	333	353
21	345	9	336	354
22	348	9	339	357
23	351	9	342	360
24	353	9	344	362
25	356	9	347	365
26	358	9	349	367
27	361	9	352	370
28	363	9	354	372
29	365	9	356	374
30	368	9	359	377
31	370	9	361	379
32	372	9	363	381
33	375	9	366	384
34	377	9	368	386
35	379	9	370	388
36	382	9	373	391
37	384	9	375	393
38	386	9	377	395
39	388	9	379	397
40	391	9	382	400
41	393	9	384	402
42	395	9	386	404
43	398	9	389	407
44	400	9	391	409
45	403	9	394	412

Table 4.20 (continued)

Form F				
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
46	405	9	396	414
47	407	9	398	416
48	410	9	401	419
49	413	9	404	422
50	415	9	406	424
51	418	10	408	428
52	421	10	411	431
53	424	10	414	434
54	427	10	417	437
55	430	10	420	440
56	433	11	422	444
57	437	11	426	448
58	441	11	430	452
59	445	12	433	457
60	449	12	437	461
61	454	13	441	467
62	459	13	446	472
63	464	14	450	478
64	471	15	456	486
65	478	16	462	494
66	487	17	470	504
67	497	19	478	516
68	510	22	488	532
69	527	26	501	553
70	555	35	520	590
71	581	48	533	629

Note. [a]LOSS was set to 240.

Table 4.21 The 2008 MSA-Math Subtotal Raw Score to Scale Score Conversion Table: Grade 4 Form A

		Form A			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
AL	0	240[a]	49	240[a]	288
AL	1	265	36	240[a]	301
AL	2	293	27	266	320
AL	3	312	23	289	335
AL	4	327	21	306	348
AL	5	339	20	319	359
AL	6	351	19	332	370
AL	7	363	19	344	382
AL	8	374	19	355	393
AL	9	386	20	366	406
AL	10	399	21	378	420
AL	11	414	23	391	437
AL	12	432	27	405	459
AL	13	460	36	424	496
AL	14	486	48	438	534
GM	0	240[a]	51	240[a]	290
GM	1	269	39	240[a]	308
GM	2	304	30	274	334
GM	3	327	26	301	353
GM	4	345	23	322	368
GM	5	360	21	339	381
GM	6	373	21	352	394
GM	7	385	20	365	405
GM	8	398	20	378	418
GM	9	410	20	390	430
GM	10	423	21	402	444
GM	11	438	23	415	461
GM	12	456	26	430	482
GM	13	484	35	449	519
GM	14	509	48	461	557
SP	0	259	48	240[a]	307
SP	1	283	35	248	318
SP	2	310	26	284	336
SP	3	327	22	305	349
SP	4	341	20	321	361
SP	5	352	19	333	371
SP	6	363	19	344	382
SP	7	374	19	355	393
SP	8	385	19	366	404
SP	9	395	19	376	414
SP	10	407	20	387	427
SP	11	419	21	398	440
SP	12	433	23	410	456
SP	13	451	26	425	477
SP	14	479	35	444	514
SP	15	503	48	455	551
NC	0	258	48	240[a]	306
NC	1	283	35	248	318

Table 4.21 (continued)

Form A					
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
NC	2	311	27	284	338
NC	3	329	23	306	352
NC	4	344	21	323	365
NC	5	357	20	337	377
NC	6	369	20	349	389
NC	7	381	20	361	401
NC	8	393	20	373	413
NC	9	405	20	385	425
NC	10	418	21	397	439
NC	11	433	23	410	456
NC	12	452	27	425	479
NC	13	480	35	445	515
NC	14	505	48	457	553
PR	0	274	49	240[a]	323
PR	1	300	37	263	337
PR	2	331	29	302	360
PR	3	354	26	328	380
PR	4	372	24	348	396
PR	5	390	23	367	413
PR	6	406	23	383	429
PR	7	422	23	399	445
PR	8	438	23	415	461
PR	9	454	24	430	478
PR	10	472	24	448	496
PR	11	490	26	464	516
PR	12	512	28	484	540
PR	13	543	36	507	579
PR	14	569	49	520	618

Note. [a]LOSS was set to 240.

Note. AL=Algebra, GM=Geometry and Measurement, SP=Statistics and Probability, NC=Numbers and Computation, PR=Process.

Table 4.22 The 2008 MSA-Math Subtotal Raw Score to Scale Score Conversion Table: Grade 4 Form F

		Form F			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
AL	0	250	48	240[a]	298
AL	1	275	35	240	310
AL	2	302	26	276	328
AL	3	320	23	297	343
AL	4	334	21	313	355
AL	5	346	19	327	365
AL	6	357	19	338	376
AL	7	368	19	349	387
AL	8	378	19	359	397
AL	9	389	19	370	408
AL	10	401	20	381	421
AL	11	415	22	393	437
AL	12	432	26	406	458
AL	13	459	35	424	494
AL	14	483	48	435	531
GM	0	240[a]	54	240[a]	290
GM	1	271	43	240[a]	314
GM	2	311	31	280	342
GM	3	334	25	309	359
GM	4	352	22	330	374
GM	5	366	21	345	387
GM	6	378	20	358	398
GM	7	390	20	370	410
GM	8	402	20	382	422
GM	9	413	20	393	433
GM	10	426	21	405	447
GM	11	440	23	417	463
GM	12	458	26	432	484
GM	13	485	35	450	520
GM	14	510	48	462	558
SP	0	252	48	240[a]	300
SP	1	277	35	242	312
SP	2	304	26	278	330
SP	3	322	23	299	345
SP	4	336	21	315	357
SP	5	349	20	329	369
SP	6	360	19	341	379
SP	7	371	19	352	390
SP	8	381	19	362	400
SP	9	392	19	373	411
SP	10	403	20	383	423
SP	11	415	21	394	436
SP	12	429	22	407	451
SP	13	447	26	421	473
SP	14	474	35	439	509
SP	15	499	48	451	547
NC	0	247	48	240[a]	295
NC	1	272	35	240[a]	307

Table 4.22 (continued)

Form F					
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
NC	2	299	26	273	325
NC	3	317	23	294	340
NC	4	331	21	310	352
NC	5	343	19	324	362
NC	6	354	19	335	373
NC	7	365	19	346	384
NC	8	375	19	356	394
NC	9	386	19	367	405
NC	10	398	20	378	418
NC	11	411	22	389	433
NC	12	429	26	403	455
NC	13	455	35	420	490
NC	14	479	48	431	527
PR	0	278	50	240[a]	328
PR	1	305	37	268	342
PR	2	336	28	308	364
PR	3	355	24	331	379
PR	4	371	22	349	393
PR	5	384	20	364	404
PR	6	397	20	377	417
PR	7	409	20	389	429
PR	8	421	21	400	442
PR	9	435	22	413	457
PR	10	452	25	427	477
PR	11	473	28	445	501
PR	12	501	32	469	533
PR	13	537	39	498	576
PR	14	567	51	516	618

Note. [a]LOSS was set to 240.

Note. AL=Algebra, GM=Geometry and Measurement, SP=Statistics and Probability, NC=Numbers and Computation, PR=Process.

Table 4.23 The 2008 MSA-Math Total Raw Score to Scale Score Conversion Table: Grade 5 Form A

	Form A			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
0	240[a]	44	240[a]	268
1	246	31	240[a]	277
2	269	23	246	292
3	283	19	264	302
4	293	17	276	310
5	301	15	286	316
6	308	14	294	322
7	313	13	300	326
8	319	12	307	331
9	323	12	311	335
10	328	11	317	339
11	332	11	321	343
12	336	11	325	347
13	339	10	329	349
14	342	10	332	352
15	346	10	336	356
16	349	10	339	359
17	352	9	343	361
18	355	9	346	364
19	357	9	348	366
20	360	9	351	369
21	363	9	354	372
22	365	9	356	374
23	368	9	359	377
24	370	9	361	379
25	372	9	363	381
26	375	8	367	383
27	377	8	369	385
28	379	8	371	387
29	382	8	374	390
30	384	8	376	392
31	386	8	378	394
32	388	8	380	396
33	391	8	383	399
34	393	8	385	401
35	395	8	387	403
36	397	8	389	405
37	399	8	391	407
38	402	8	394	410
39	404	8	396	412
40	406	8	398	414
41	408	8	400	416
42	410	8	402	418
43	413	8	405	421
44	415	8	407	423
45	417	8	409	425

Table 4.23 (continued)

Form A				
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
46	419	8	411	427
47	422	8	414	430
48	424	8	416	432
49	426	9	417	435
50	429	9	420	438
51	431	9	422	440
52	434	9	425	443
53	436	9	427	445
54	439	9	430	448
55	442	9	433	451
56	444	9	435	453
57	447	10	437	457
58	450	10	440	460
59	453	10	443	463
60	457	10	447	467
61	460	11	449	471
62	464	11	453	475
63	468	11	457	479
64	472	12	460	484
65	477	12	465	489
66	482	13	469	495
67	488	14	474	502
68	494	15	479	509
69	502	16	486	518
70	511	18	493	529
71	523	20	503	543
72	538	24	514	562
73	563	32	531	595
74	586	45	541	631

Note. [a]LOSS was set to 240.

Table 4.24 The 2008 MSA-Math Total Raw Score to Scale Score Conversion Table: Grade 5 Form F

	Form F			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
0	240[a]	44	240[a]	266
1	244	32	240[a]	276
2	267	23	244	290
3	281	19	262	300
4	291	17	274	308
5	300	15	285	315
6	307	14	293	321
7	313	13	300	326
8	318	12	306	330
9	323	12	311	335
10	327	11	316	338
11	331	11	320	342
12	335	11	324	346
13	339	10	329	349
14	342	10	332	352
15	345	10	335	355
16	349	10	339	359
17	352	10	342	362
18	355	9	346	364
19	357	9	348	366
20	360	9	351	369
21	363	9	354	372
22	365	9	356	374
23	368	9	359	377
24	370	9	361	379
25	373	9	364	382
26	375	9	366	384
27	378	9	369	387
28	380	8	372	388
29	382	8	374	390
30	385	8	377	393
31	387	8	379	395
32	389	8	381	397
33	391	8	383	399
34	394	8	386	402
35	396	8	388	404
36	398	8	390	406
37	400	8	392	408
38	402	8	394	410
39	405	8	397	413
40	407	8	399	415
41	409	8	401	417
42	411	8	403	419
43	414	8	406	422
44	416	8	408	424
45	418	8	410	426

Table 4.24 (continued)

Form F				
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
46	421	8	413	429
47	423	8	415	431
48	425	9	416	434
49	428	9	419	437
50	430	9	421	439
51	433	9	424	442
52	435	9	426	444
53	438	9	429	447
54	440	9	431	449
55	443	9	434	452
56	446	9	437	455
57	449	10	439	459
58	452	10	442	462
59	455	10	445	465
60	459	10	449	469
61	462	11	451	473
62	466	11	455	477
63	470	11	459	481
64	474	12	462	486
65	479	12	467	491
66	484	13	471	497
67	490	14	476	504
68	497	15	482	512
69	505	16	489	521
70	514	18	496	532
71	525	20	505	545
72	541	24	517	565
73	566	33	533	599
74	589	45	544	634

Note. [a]LOSS was set to 240.

Table 4.25 The 2008 MSA-Math Subtotal Raw Score to Scale Score Conversion Table: Grade 5 Form A

		Form A			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
AL	0	263	45	240[a]	308
AL	1	286	33	253	319
AL	2	312	25	287	337
AL	3	328	21	307	349
AL	4	342	20	322	362
AL	5	354	19	335	373
AL	6	365	18	347	383
AL	7	375	18	357	393
AL	8	386	18	368	404
AL	9	397	18	379	415
AL	10	408	19	389	427
AL	11	420	20	400	440
AL	12	434	22	412	456
AL	13	451	25	426	476
AL	14	477	33	444	510
AL	15	501	45	456	546
GM	0	297	45	252	342
GM	1	321	33	288	354
GM	2	347	25	322	372
GM	3	364	22	342	386
GM	4	378	20	358	398
GM	5	390	19	371	409
GM	6	402	18	384	420
GM	7	412	18	394	430
GM	8	423	18	405	441
GM	9	434	19	415	453
GM	10	446	19	427	465
GM	11	459	21	438	480
GM	12	475	24	451	499
GM	13	500	32	468	532
GM	14	523	45	478	568
SP	0	276	45	240[a]	321
SP	1	299	33	266	332
SP	2	325	24	301	349
SP	3	341	21	320	362
SP	4	354	19	335	373
SP	5	366	18	348	384
SP	6	376	18	358	394
SP	7	387	18	369	405
SP	8	398	18	380	416
SP	9	409	19	390	428
SP	10	422	21	401	443
SP	11	438	24	414	462
SP	12	463	32	431	495
SP	13	486	45	441	531
NC	0	284	45	240[a]	329
NC	1	307	32	275	339
NC	2	331	24	307	355

Table 4.25 (continued)

Form A					
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
NC	3	347	21	326	368
NC	4	360	19	341	379
NC	5	370	18	352	388
NC	6	380	17	363	397
NC	7	390	17	373	407
NC	8	399	17	382	416
NC	9	408	17	391	425
NC	10	418	18	400	436
NC	11	429	19	410	448
NC	12	441	21	420	462
NC	13	457	24	433	481
NC	14	482	32	450	514
NC	15	505	45	460	550
PR	0	270	48	240[a]	318
PR	1	298	37	261	335
PR	2	332	29	303	361
PR	3	356	25	331	381
PR	4	374	23	351	397
PR	5	390	21	369	411
PR	6	403	19	384	422
PR	7	414	18	396	432
PR	8	425	18	407	443
PR	9	435	17	418	452
PR	10	445	18	427	463
PR	11	455	18	437	473
PR	12	467	20	447	487
PR	13	481	21	460	502
PR	14	497	23	474	520
PR	15	517	27	490	544
PR	16	547	35	512	582
PR	17	573	46	527	619

Note. [a]LOSS was set to 240.

Note. AL=Algebra, GM=Geometry and Measurement, SP=Statistics and Probability, NC=Numbers and Computation, PR=Process.

Table 4.26 The 2008 MSA-Math Subtotal Raw Score to Scale Score Conversion Table: Grade 5 Form F

		Form F			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
AL	0	264	45	240[a]	309
AL	1	287	32	255	319
AL	2	312	24	288	336
AL	3	328	21	307	349
AL	4	341	19	322	360
AL	5	353	18	335	371
AL	6	363	18	345	381
AL	7	373	18	355	391
AL	8	384	18	366	402
AL	9	394	18	376	412
AL	10	405	19	386	424
AL	11	417	20	397	437
AL	12	430	22	408	452
AL	13	448	25	423	473
AL	14	474	33	441	507
AL	15	498	45	453	543
GM	0	304	45	259	349
GM	1	327	33	294	360
GM	2	353	25	328	378
GM	3	371	22	349	393
GM	4	385	20	365	405
GM	5	397	19	378	416
GM	6	408	18	390	426
GM	7	418	18	400	436
GM	8	428	18	410	446
GM	9	439	18	421	457
GM	10	450	19	431	469
GM	11	463	21	442	484
GM	12	479	24	455	503
GM	13	504	32	472	536
GM	14	527	45	482	572
SP	0	274	45	240[a]	319
SP	1	297	33	264	330
SP	2	322	25	297	347
SP	3	339	21	318	360
SP	4	352	19	333	371
SP	5	364	18	346	382
SP	6	375	18	357	393
SP	7	385	18	367	403
SP	8	396	18	378	414
SP	9	407	19	388	426
SP	10	420	21	399	441
SP	11	436	24	412	460
SP	12	461	32	429	493
SP	13	484	45	439	529
NC	0	284	45	240[a]	329
NC	1	307	32	275	339
NC	2	332	24	308	356
NC	3	348	21	327	369

Table 4.26 (continued)

		Form F			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
NC	4	361	19	342	380
NC	5	372	18	354	390
NC	6	382	17	365	399
NC	7	392	17	375	409
NC	8	402	17	385	419
NC	9	411	17	394	428
NC	10	421	18	403	439
NC	11	433	19	414	452
NC	12	445	21	424	466
NC	13	462	24	438	486
NC	14	487	32	455	519
NC	15	510	45	465	555
PR	0	261	48	240[a]	309
PR	1	290	37	253	327
PR	2	325	30	295	355
PR	3	351	27	324	378
PR	4	372	24	348	396
PR	5	389	22	367	411
PR	6	403	20	383	423
PR	7	415	19	396	434
PR	8	426	18	408	444
PR	9	436	18	418	454
PR	10	446	18	428	464
PR	11	457	19	438	476
PR	12	470	20	450	490
PR	13	483	22	461	505
PR	14	500	24	476	524
PR	15	521	27	494	548
PR	16	551	35	516	586
PR	17	577	46	531	623

Note. [a]LOSS was set to 240.

Note. AL=Algebra, GM=Geometry and Measurement, SP=Statistics and Probability, NC=Numbers and Computation, PR=Process.

Table 4.27 The 2008 MSA-Math Total Raw Score to Scale Score Conversion Table: Grade 6 Form A

	Form A			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
0	242	42	240[a]	284
1	263	30	240[a]	293
2	284	22	262	306
3	297	18	279	315
4	306	16	290	322
5	314	14	300	328
6	320	13	307	333
7	326	12	314	338
8	331	12	319	343
9	335	11	324	346
10	339	11	328	350
11	343	10	333	353
12	346	10	336	356
13	350	10	340	360
14	353	10	343	363
15	356	9	347	365
16	359	9	350	368
17	361	9	352	370
18	364	9	355	373
19	366	9	357	375
20	369	9	360	378
21	371	8	363	379
22	374	8	366	382
23	376	8	368	384
24	378	8	370	386
25	381	8	373	389
26	383	8	375	391
27	385	8	377	393
28	387	8	379	395
29	389	8	381	397
30	391	8	383	399
31	393	8	385	401
32	395	8	387	403
33	397	8	389	405
34	399	8	391	407
35	401	8	393	409
36	403	8	395	411
37	405	8	397	413
38	407	8	399	415
39	410	8	402	418
40	412	8	404	420
41	414	8	406	422
42	416	8	408	424
43	418	8	410	426
44	420	8	412	428
45	422	8	414	430

Table 4.27 (continued)

Form A				
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
46	424	8	416	432
47	427	8	419	435
48	429	8	421	437
49	431	8	423	439
50	434	9	425	443
51	436	9	427	445
52	439	9	430	448
53	441	9	432	450
54	444	9	435	453
55	447	9	438	456
56	450	10	440	460
57	453	10	443	463
58	456	10	446	466
59	460	10	450	470
60	464	11	453	475
61	468	11	457	479
62	472	12	460	484
63	477	13	464	490
64	483	13	470	496
65	490	14	476	504
66	497	16	481	513
67	507	18	489	525
68	520	22	498	542
69	542	30	512	572
70	564	42	522	606

Note. [a]LOSS was set to 240.

Table 4.28 The 2008 MSA-Math Total Raw Score to Scale Score Conversion Table: Grade 6 Form F

	Form F			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
0	240[a]	42	240[a]	280
1	259	30	240[a]	289
2	281	22	259	303
3	294	18	276	312
4	303	16	287	319
5	311	14	297	325
6	317	13	304	330
7	323	12	311	335
8	328	12	316	340
9	332	11	321	343
10	337	11	326	348
11	340	10	330	350
12	344	10	334	354
13	347	10	337	357
14	351	10	341	361
15	354	9	345	363
16	357	9	348	366
17	359	9	350	368
18	362	9	353	371
19	365	9	356	374
20	367	9	358	376
21	370	9	361	379
22	372	8	364	380
23	375	8	367	383
24	377	8	369	385
25	379	8	371	387
26	382	8	374	390
27	384	8	376	392
28	386	8	378	394
29	388	8	380	396
30	390	8	382	398
31	392	8	384	400
32	395	8	387	403
33	397	8	389	405
34	399	8	391	407
35	401	8	393	409
36	403	8	395	411
37	405	8	397	413
38	407	8	399	415
39	409	8	401	417
40	411	8	403	419
41	414	8	406	422
42	416	8	408	424
43	418	8	410	426
44	420	8	412	428
45	422	8	414	430

Table 4.28 (continued)

Form F				
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
46	425	8	417	433
47	427	8	419	435
48	429	8	421	437
49	432	9	423	441
50	434	9	425	443
51	437	9	428	446
52	439	9	430	448
53	442	9	433	451
54	445	9	436	454
55	448	9	439	457
56	451	10	441	461
57	454	10	444	464
58	458	10	448	468
59	461	11	450	472
60	465	11	454	476
61	470	11	459	481
62	474	12	462	486
63	479	13	466	492
64	485	13	472	498
65	492	15	477	507
66	500	16	484	516
67	509	18	491	527
68	523	22	501	545
69	545	30	515	575
70	566	42	524	608

Note. [a]LOSS was set to 240.

Table 4.29 The 2008 MSA-Math Subtotal Raw Score to Scale Score Conversion Table: Grade 6 Form A

		Form A			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
AL	0	283	43	240	326
AL	1	305	32	273	337
AL	2	330	24	306	354
AL	3	347	21	326	368
AL	4	360	19	341	379
AL	5	372	18	354	390
AL	6	382	17	365	399
AL	7	392	17	375	409
AL	8	402	17	385	419
AL	9	412	18	394	430
AL	10	423	18	405	441
AL	11	435	20	415	455
AL	12	451	23	428	474
AL	13	475	31	444	506
AL	14	497	43	454	540
GM	0	303	43	260	346
GM	1	326	31	295	357
GM	2	350	23	327	373
GM	3	366	20	346	386
GM	4	378	18	360	396
GM	5	389	17	372	406
GM	6	399	17	382	416
GM	7	409	17	392	426
GM	8	418	17	401	435
GM	9	428	18	410	446
GM	10	439	18	421	457
GM	11	452	20	432	472
GM	12	467	23	444	490
GM	13	492	31	461	523
GM	14	514	43	471	557
SP	0	288	43	245	331
SP	1	311	32	279	343
SP	2	335	24	311	359
SP	3	351	21	330	372
SP	4	365	19	346	384
SP	5	376	18	358	394
SP	6	387	18	369	405
SP	7	398	18	380	416
SP	8	409	18	391	427
SP	9	421	19	402	440
SP	10	434	21	413	455
SP	11	450	24	426	474
SP	12	475	31	444	506
SP	13	497	43	454	540
NC	0	300	43	257	343
NC	1	322	31	291	353
NC	2	347	23	324	370
NC	3	362	20	342	382

Table 4.29 (continued)

Form A					
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
NC	4	375	18	357	393
NC	5	385	17	368	402
NC	6	395	17	378	412
NC	7	404	17	387	421
NC	8	414	17	397	431
NC	9	423	17	406	440
NC	10	434	18	416	452
NC	11	446	20	426	466
NC	12	461	23	438	484
NC	13	484	31	453	515
NC	14	506	43	463	549
PR	0	286	44	242	330
PR	1	309	32	277	341
PR	2	335	25	310	360
PR	3	353	22	331	375
PR	4	367	20	347	387
PR	5	380	19	361	399
PR	6	392	18	374	410
PR	7	403	18	385	421
PR	8	415	18	397	433
PR	9	426	19	407	445
PR	10	438	19	419	457
PR	11	452	20	432	472
PR	12	467	22	445	489
PR	13	486	25	461	511
PR	14	513	33	480	546
PR	15	537	44	493	581

Note. [a]LOSS was set to 240.

Note. AL=Algebra, GM=Geometry and Measurement, SP=Statistics and Probability, NC=Numbers and Computation, PR=Process.

Table 4.30 The 2008 MSA-Math Subtotal Raw Score to Scale Score Conversion Table: Grade 6 Form F

		Form F			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
AL	0	278	43	240[a]	321
AL	1	301	32	269	333
AL	2	326	24	302	350
AL	3	343	21	322	364
AL	4	356	19	337	375
AL	5	368	18	350	386
AL	6	379	18	361	397
AL	7	389	17	372	406
AL	8	399	17	382	416
AL	9	410	18	392	428
AL	10	421	19	402	440
AL	11	434	20	414	454
AL	12	450	24	426	474
AL	13	474	32	442	506
AL	14	497	43	454	540
GM	0	291	44	247	335
GM	1	314	32	282	346
GM	2	340	25	315	365
GM	3	358	21	337	379
GM	4	371	19	352	390
GM	5	383	18	365	401
GM	6	394	18	376	412
GM	7	404	17	387	421
GM	8	415	18	397	433
GM	9	425	18	407	443
GM	10	437	19	418	456
GM	11	451	21	430	472
GM	12	468	24	444	492
GM	13	494	32	462	526
GM	14	517	44	473	561
SP	0	285	43	242	328
SP	1	307	32	275	339
SP	2	332	24	308	356
SP	3	349	21	328	370
SP	4	362	19	343	381
SP	5	374	18	356	392
SP	6	385	18	367	403
SP	7	395	18	377	413
SP	8	406	18	388	424
SP	9	418	19	399	437
SP	10	431	21	410	452
SP	11	448	24	424	472
SP	12	472	31	441	503
SP	13	495	43	452	538
NC	0	300	43	257	343
NC	1	323	31	292	354
NC	2	347	23	324	370
NC	3	363	20	343	383

Table 4.30 (continued)

		Form F			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
NC	4	375	18	357	393
NC	5	386	17	369	403
NC	6	396	17	379	413
NC	7	405	17	388	422
NC	8	414	17	397	431
NC	9	424	17	407	441
NC	10	434	18	416	452
NC	11	446	20	426	466
NC	12	461	23	438	484
NC	13	485	31	454	516
NC	14	507	43	464	550
PR	0	289	44	245	333
PR	1	313	33	280	346
PR	2	340	25	315	365
PR	3	359	22	337	381
PR	4	374	20	354	394
PR	5	387	19	368	406
PR	6	399	19	380	418
PR	7	411	19	392	430
PR	8	423	18	405	441
PR	9	434	19	415	453
PR	10	446	19	427	465
PR	11	459	20	439	479
PR	12	474	22	452	496
PR	13	492	25	467	517
PR	14	518	32	486	550
PR	15	541	44	497	585

Note. [a]LOSS was set to 240.

Note. AL=Algebra, GM=Geometry and Measurement, SP=Statistics and Probability, NC=Numbers and Computation, PR=Process.

Table 4.31 The 2008 MSA-Math Total Raw Score to Scale Score Conversion Table: Grade 7 Form A

	Form A			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
0	243	41	240[a]	284
1	265	30	240[a]	295
2	288	22	266	310
3	302	18	284	320
4	312	16	296	328
5	320	14	306	334
6	326	13	313	339
7	332	12	320	344
8	337	12	325	349
9	341	11	330	352
10	346	10	336	356
11	349	10	339	359
12	353	10	343	363
13	356	9	347	365
14	359	9	350	368
15	362	9	353	371
16	365	9	356	374
17	368	9	359	377
18	370	8	362	378
19	373	8	365	381
20	375	8	367	383
21	377	8	369	385
22	380	8	372	388
23	382	8	374	390
24	384	8	376	392
25	386	8	378	394
26	389	8	381	397
27	391	8	383	399
28	393	8	385	401
29	395	8	387	403
30	397	8	389	405
31	399	8	391	407
32	401	8	393	409
33	403	8	395	411
34	405	8	397	413
35	407	8	399	415
36	409	8	401	417
37	412	8	404	420
38	414	8	406	422
39	416	8	408	424
40	418	8	410	426
41	420	8	412	428
42	422	8	414	430
43	424	8	416	432
44	426	8	418	434
45	429	8	421	437

Table 4.31 (continued)

		Form A		
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
46	431	8	423	439
47	433	8	425	441
48	436	8	428	444
49	438	8	430	446
50	440	8	432	448
51	443	8	435	451
52	446	9	437	455
53	448	9	439	457
54	451	9	442	460
55	454	9	445	463
56	457	9	448	466
57	460	9	451	469
58	463	10	453	473
59	467	10	457	477
60	470	10	460	480
61	474	11	463	485
62	478	11	467	489
63	483	12	471	495
64	488	12	476	500
65	494	13	481	507
66	500	14	486	514
67	508	15	493	523
68	517	17	500	534
69	529	20	509	549
70	547	25	522	572
71	577	34	543	611
72	604	45	559	649

Note. [a]LOSS was set to 240.

Table 4.32 The 2008 MSA-Math Total Raw Score to Scale Score Conversion Table: Grade 7 Form F

	Form F			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
0	249	40	240[a]	289
1	269	29	240	298
2	290	20	270	310
3	302	17	285	319
4	311	15	296	326
5	318	13	305	331
6	324	12	312	336
7	329	12	317	341
8	333	11	322	344
9	337	10	327	347
10	341	10	331	351
11	345	10	335	355
12	348	9	339	357
13	351	9	342	360
14	354	9	345	363
15	357	9	348	366
16	359	9	350	368
17	362	8	354	370
18	364	8	356	372
19	367	8	359	375
20	369	8	361	377
21	371	8	363	379
22	374	8	366	382
23	376	8	368	384
24	378	8	370	386
25	380	8	372	388
26	382	8	374	390
27	384	8	376	392
28	386	8	378	394
29	388	8	380	396
30	390	8	382	398
31	392	8	384	400
32	394	8	386	402
33	397	8	389	405
34	399	8	391	407
35	401	8	393	409
36	403	8	395	411
37	405	8	397	413
38	407	8	399	415
39	409	8	401	417
40	411	8	403	419
41	413	8	405	421
42	415	8	407	423
43	417	8	409	425
44	420	8	412	428
45	422	8	414	430

Table 4.32 (continued)

Form F				
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
46	424	8	416	432
47	426	8	418	434
48	429	8	421	437
49	431	8	423	439
50	434	8	426	442
51	436	9	427	445
52	439	9	430	448
53	442	9	433	451
54	444	9	435	453
55	447	9	438	456
56	450	9	441	459
57	454	10	444	464
58	457	10	447	467
59	461	10	451	471
60	464	11	453	475
61	469	11	458	480
62	473	12	461	485
63	478	12	466	490
64	484	13	471	497
65	490	14	476	504
66	497	15	482	512
67	505	16	489	521
68	516	18	498	534
69	529	21	508	550
70	547	25	522	572
71	575	32	543	607
72	599	43	556	642

Note. [a]LOSS was set to 240.

Table 4.33 The 2008 MSA-Math Subtotal Raw Score to Scale Score Conversion Table: Grade 7 Form A

		Form A			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
AL	0	306	41	265	347
AL	1	328	30	298	358
AL	2	351	22	329	373
AL	3	366	19	347	385
AL	4	378	18	360	396
AL	5	389	17	372	406
AL	6	400	17	383	417
AL	7	410	17	393	427
AL	8	420	17	403	437
AL	9	431	18	413	449
AL	10	443	19	424	462
AL	11	456	20	436	476
AL	12	473	23	450	496
AL	13	498	31	467	529
AL	14	520	42	478	562
GM	0	315	41	274	356
GM	1	336	30	306	366
GM	2	360	23	337	383
GM	3	376	20	356	396
GM	4	389	19	370	408
GM	5	400	18	382	418
GM	6	412	18	394	430
GM	7	423	18	405	441
GM	8	434	18	416	452
GM	9	446	19	427	465
GM	10	460	21	439	481
GM	11	478	24	454	502
GM	12	503	31	472	534
GM	13	526	42	484	568
SP	0	295	41	254	336
SP	1	316	30	286	346
SP	2	338	22	316	360
SP	3	353	19	334	372
SP	4	365	17	348	382
SP	5	375	16	359	391
SP	6	384	16	368	400
SP	7	393	16	377	409
SP	8	402	16	386	418
SP	9	412	16	396	428
SP	10	422	17	405	439
SP	11	433	19	414	452
SP	12	448	22	426	470
SP	13	471	30	441	501
SP	14	492	41	451	533
NC	0	294	42	252	336
NC	1	317	32	285	349
NC	2	343	24	319	367
NC	3	361	21	340	382

Table 4.33 (continued)

Form A					
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
NC	4	374	19	355	393
NC	5	386	18	368	404
NC	6	397	17	380	414
NC	7	407	17	390	424
NC	8	417	17	400	434
NC	9	427	17	410	444
NC	10	438	18	420	456
NC	11	451	20	431	471
NC	12	467	23	444	490
NC	13	490	30	460	520
NC	14	512	41	471	553
PR	0	272	47	240[a]	319
PR	1	302	37	265	339
PR	2	337	27	310	364
PR	3	357	22	335	379
PR	4	372	19	353	391
PR	5	384	18	366	402
PR	6	396	18	378	414
PR	7	407	18	389	425
PR	8	418	18	400	436
PR	9	430	18	412	448
PR	10	441	18	423	459
PR	11	453	18	435	471
PR	12	465	19	446	484
PR	13	480	21	459	501
PR	14	498	24	474	522
PR	15	522	29	493	551
PR	16	563	39	524	602
PR	17	596	48	548	644

Note. [a]LOSS was set to 240.

Note. AL=Algebra, GM=Geometry and Measurement, SP=Statistics and Probability, NC=Numbers and Computation, PR=Process.

Table 4.34 The 2008 MSA-Math Subtotal Raw Score to Scale Score Conversion Table: Grade 7 Form F

		Form F			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
AL	0	300	41	259	341
AL	1	321	30	291	351
AL	2	345	23	322	368
AL	3	360	20	340	380
AL	4	373	18	355	391
AL	5	384	17	367	401
AL	6	394	17	377	411
AL	7	404	17	387	421
AL	8	414	17	397	431
AL	9	424	17	407	441
AL	10	435	18	417	453
AL	11	448	20	428	468
AL	12	464	23	441	487
AL	13	488	30	458	518
AL	14	510	41	469	551
GM	0	317	41	276	358
GM	1	338	30	308	368
GM	2	361	22	339	383
GM	3	377	19	358	396
GM	4	389	18	371	407
GM	5	400	17	383	417
GM	6	410	17	393	427
GM	7	420	17	403	437
GM	8	430	17	413	447
GM	9	441	18	423	459
GM	10	453	19	434	472
GM	11	469	22	447	491
GM	12	492	30	462	522
GM	13	513	41	472	554
SP	0	291	41	250	332
SP	1	312	30	282	342
SP	2	335	22	313	357
SP	3	350	19	331	369
SP	4	362	18	344	380
SP	5	372	17	355	389
SP	6	382	16	366	398
SP	7	391	16	375	407
SP	8	400	16	384	416
SP	9	409	16	393	425
SP	10	419	17	402	436
SP	11	431	19	412	450
SP	12	446	22	424	468
SP	13	468	30	438	498
SP	14	489	41	448	530
NC	0	294	42	252	336
NC	1	317	32	285	349
NC	2	343	24	319	367
NC	3	361	21	340	382

Table 4.34 (continued)

		Form F			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
NC	4	375	19	356	394
NC	5	386	18	368	404
NC	6	397	17	380	414
NC	7	408	17	391	425
NC	8	418	17	401	435
NC	9	428	17	411	445
NC	10	440	18	422	458
NC	11	453	20	433	473
NC	12	469	23	446	492
NC	13	493	30	463	523
NC	14	515	41	474	556
PR	0	288	40	248	328
PR	1	308	29	279	337
PR	2	330	21	309	351
PR	3	343	18	325	361
PR	4	354	17	337	371
PR	5	363	16	347	379
PR	6	372	16	356	388
PR	7	381	16	365	397
PR	8	391	17	374	408
PR	9	402	18	384	420
PR	10	415	20	395	435
PR	11	431	22	409	453
PR	12	451	25	426	476
PR	13	474	27	447	501
PR	14	500	28	472	528
PR	15	530	30	500	560
PR	16	566	35	531	601
PR	17	593	45	548	638

Note. [a]LOSS was set to 240.

Note. AL=Algebra, GM=Geometry and Measurement, SP=Statistics and Probability, NC=Numbers and Computation, PR=Process.

Table 4.35 The 2008 MSA-Math Total Raw Score to Scale Score Conversion Table: Grade 8 Form A

	Form A			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
0	268	40	240[a]	308
1	288	29	259	317
2	308	21	287	329
3	321	17	304	338
4	330	15	315	345
5	337	14	323	351
6	343	13	330	356
7	348	12	336	360
8	353	11	342	364
9	357	11	346	368
10	361	10	351	371
11	364	10	354	374
12	367	10	357	377
13	371	9	362	380
14	373	9	364	382
15	376	9	367	385
16	379	9	370	388
17	382	8	374	390
18	384	8	376	392
19	386	8	378	394
20	389	8	381	397
21	391	8	383	399
22	393	8	385	401
23	396	8	388	404
24	398	8	390	406
25	400	8	392	408
26	402	8	394	410
27	404	8	396	412
28	406	8	398	414
29	408	8	400	416
30	410	7	403	417
31	412	7	405	419
32	414	7	407	421
33	416	7	409	423
34	418	7	411	425
35	420	7	413	427
36	421	7	414	428
37	423	7	416	430
38	425	7	418	432
39	427	7	420	434
40	429	7	422	436
41	431	7	424	438
42	433	7	426	440
43	435	7	428	442
44	437	7	430	444
45	439	7	432	446

Table 4.35 (continued)

		Form A		
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
46	441	8	433	449
47	443	8	435	451
48	445	8	437	453
49	447	8	439	455
50	449	8	441	457
51	451	8	443	459
52	453	8	445	461
53	456	8	448	464
54	458	8	450	466
55	460	8	452	468
56	463	9	454	472
57	465	9	456	474
58	468	9	459	477
59	471	9	462	480
60	474	9	465	483
61	477	10	467	487
62	481	10	471	491
63	485	11	474	496
64	489	11	478	500
65	493	12	481	505
66	498	12	486	510
67	504	13	491	517
68	510	14	496	524
69	518	16	502	534
70	528	18	510	546
71	542	22	520	564
72	564	30	534	594
73	585	41	544	626

Note. [a]LOSS was set to 240.

Table 4.36 The 2008 MSA-Math Total Raw Score to Scale Score Conversion Table: Grade 8 Form F

	Form F			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
0	259	41	240[a]	300
1	279	29	250	308
2	300	21	279	321
3	313	17	296	330
4	322	15	307	337
5	329	14	315	343
6	336	13	323	349
7	341	12	329	353
8	346	11	335	357
9	350	11	339	361
10	354	10	344	364
11	358	10	348	368
12	362	10	352	372
13	365	10	355	375
14	368	9	359	377
15	371	9	362	380
16	374	9	365	383
17	377	9	368	386
18	379	9	370	388
19	382	8	374	390
20	384	8	376	392
21	387	8	379	395
22	389	8	381	397
23	391	8	383	399
24	394	8	386	402
25	396	8	388	404
26	398	8	390	406
27	400	8	392	408
28	402	8	394	410
29	404	8	396	412
30	406	8	398	414
31	408	8	400	416
32	410	8	402	418
33	412	8	404	420
34	414	7	407	421
35	416	7	409	423
36	418	7	411	425
37	420	7	413	427
38	422	7	415	429
39	424	7	417	431
40	426	7	419	433
41	428	7	421	435
42	430	7	423	437
43	432	7	425	439
44	434	8	426	442
45	436	8	428	444

Table 4.36 (continued)

	Form F			
Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
46	438	8	430	446
47	440	8	432	448
48	442	8	434	450
49	444	8	436	452
50	446	8	438	454
51	448	8	440	456
52	451	8	443	459
53	453	8	445	461
54	455	8	447	463
55	458	8	450	466
56	460	8	452	468
57	463	9	454	472
58	465	9	456	474
59	468	9	459	477
60	471	9	462	480
61	474	10	464	484
62	478	10	468	488
63	481	10	471	491
64	485	11	474	496
65	490	11	479	501
66	494	12	482	506
67	500	13	487	513
68	506	14	492	520
69	514	16	498	530
70	524	18	506	542
71	537	21	516	558
72	559	30	529	589
73	580	41	539	621

Note. [a]LOSS was set to 240.

Table 4.37 The 2008 MSA-Math Subtotal Raw Score to Scale Score Conversion Table: Grade 8 Form A

		Form A			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
AL	0	322	41	281	363
AL	1	343	30	313	373
AL	2	366	22	344	388
AL	3	381	19	362	400
AL	4	393	18	375	411
AL	5	404	17	387	421
AL	6	413	16	397	429
AL	7	422	16	406	438
AL	8	431	16	415	447
AL	9	440	16	424	456
AL	10	450	17	433	467
AL	11	460	18	442	478
AL	12	472	19	453	491
AL	13	487	22	465	509
AL	14	510	30	480	540
AL	15	532	41	491	573
GM	0	326	42	284	368
GM	1	347	30	317	377
GM	2	371	23	348	394
GM	3	387	20	367	407
GM	4	400	18	382	418
GM	5	412	17	395	429
GM	6	422	17	405	439
GM	7	432	17	415	449
GM	8	442	17	425	459
GM	9	453	18	435	471
GM	10	466	20	446	486
GM	11	481	23	458	504
GM	12	504	30	474	534
GM	13	526	41	485	567
SP	0	315	41	274	356
SP	1	336	30	306	366
SP	2	359	23	336	382
SP	3	375	20	355	395
SP	4	387	18	369	405
SP	5	398	17	381	415
SP	6	408	17	391	425
SP	7	418	17	401	435
SP	8	429	17	412	446
SP	9	439	18	421	457
SP	10	452	19	433	471
SP	11	466	21	445	487
SP	12	484	25	459	509
SP	13	512	32	480	544
SP	14	536	43	493	579
NC	0	325	41	284	366
NC	1	346	30	316	376
NC	2	370	23	347	393

Table 4.37 (continued)

Form A					
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
NC	3	386	20	366	406
NC	4	399	19	380	418
NC	5	411	18	393	429
NC	6	423	18	405	441
NC	7	435	18	417	453
NC	8	447	19	428	466
NC	9	461	21	440	482
NC	10	478	23	455	501
NC	11	503	31	472	534
NC	12	525	42	483	567
PR	0	298	41	257	339
PR	1	320	30	290	350
PR	2	343	22	321	365
PR	3	358	19	339	377
PR	4	370	17	353	387
PR	5	380	16	364	396
PR	6	389	16	373	405
PR	7	398	15	383	413
PR	8	406	15	391	421
PR	9	414	15	399	429
PR	10	422	15	407	437
PR	11	429	15	414	444
PR	12	437	15	422	452
PR	13	444	15	429	459
PR	14	453	16	437	469
PR	15	462	17	445	479
PR	16	474	20	454	494
PR	17	492	25	467	517
PR	18	524	36	488	560
PR	19	553	46	507	599

Note. [a]LOSS was set to 240.
Note. AL=Algebra, GM=Geometry and Measurement, SP=Statistics and Probability, NC=Numbers and Computation, PR=Process.

Table 4.38 The 2008 MSA-Math Subtotal Raw Score to Scale Score Conversion Table: Grade 8 Form F

		Form F			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
AL	0	314	42	272	356
AL	1	336	31	305	367
AL	2	361	23	338	384
AL	3	377	20	357	397
AL	4	390	18	372	408
AL	5	401	17	384	418
AL	6	411	17	394	428
AL	7	420	16	404	436
AL	8	430	16	414	446
AL	9	439	16	423	455
AL	10	449	17	432	466
AL	11	459	18	441	477
AL	12	471	19	452	490
AL	13	486	22	464	508
AL	14	509	30	479	539
AL	15	531	41	490	572
GM	0	324	42	282	366
GM	1	346	30	316	376
GM	2	370	23	347	393
GM	3	386	20	366	406
GM	4	399	18	381	417
GM	5	410	18	392	428
GM	6	421	17	404	438
GM	7	431	17	414	448
GM	8	442	18	424	460
GM	9	453	18	435	471
GM	10	466	20	446	486
GM	11	481	23	458	504
GM	12	505	30	475	535
GM	13	527	41	486	568
SP	0	306	42	264	348
SP	1	328	30	298	358
SP	2	352	23	329	375
SP	3	367	20	347	387
SP	4	380	18	362	398
SP	5	391	17	374	408
SP	6	402	17	385	419
SP	7	412	17	395	429
SP	8	422	17	405	439
SP	9	432	17	415	449
SP	10	444	18	426	462
SP	11	456	20	436	476
SP	12	472	23	449	495
SP	13	496	30	466	526
SP	14	518	42	476	560
NC	0	322	41	281	363
NC	1	344	30	314	374
NC	2	367	23	344	390

Table 4.38 (continued)

		Form F			
Strand	Raw Score	Scale Score (SS)	Standard Error (*SE*)	SS – 1*SE*	SS + 1*SE*
NC	3	383	20	363	403
NC	4	396	18	378	414
NC	5	408	18	390	426
NC	6	419	18	401	437
NC	7	430	18	412	448
NC	8	442	19	423	461
NC	9	455	20	435	475
NC	10	471	23	448	494
NC	11	496	31	465	527
NC	12	518	42	476	560
PR	0	285	42	243	327
PR	1	307	31	276	338
PR	2	332	23	309	355
PR	3	348	20	328	368
PR	4	361	19	342	380
PR	5	373	18	355	391
PR	6	383	17	366	400
PR	7	393	16	377	409
PR	8	402	16	386	418
PR	9	411	16	395	427
PR	10	419	15	404	434
PR	11	428	15	413	443
PR	12	436	15	421	451
PR	13	444	15	429	459
PR	14	453	16	437	469
PR	15	463	18	445	481
PR	16	475	20	455	495
PR	17	493	25	468	518
PR	18	523	34	489	557
PR	19	550	45	505	595

Note. [a]LOSS was set to 240.
Note. AL=Algebra, GM=Geometry and Measurement, SP=Statistics and Probability, NC=Numbers and Computation, PR=Process.

Table 4.39 The 2008 MSA-Math Score Difference between Rater 1 and Rater 2: Grade 3

Form	Score Range	Item CID	Perfect		Adjacent		Discrepancy		Total	
			N	%	*N*	%	*N*	%	*N*	%
A	0-1	3509918	29,039	98.89	325	1.11			29,364	100.00
	0-2	3595500	25,244	85.97	4,048	13.79	72	0.25	29,364	100.00
	0-1	3509941	28,777	98.00	587	2.00			29,364	100.00
	0-2	3595501	24,220	82.48	5,037	17.15	107	0.36	29,364	100.00
	0-1	3509957	29,089	99.06	275	0.94			29,364	100.00
	0-2	3595502	24,815	84.51	4,516	15.38	33	0.11	29,364	100.00
	0-1	3510073	28,953	98.60	411	1.40			29,364	100.00
	0-2	3595503	23,226	79.10	6,069	20.67	69	0.23	29,364	100.00
	0-1	3510072	29,060	98.96	304	1.04			29,364	100.00
	0-2	3595504	24,335	82.87	4,871	16.59	158	0.54	29,364	100.00
	0-1	3510060	28,981	98.70	383	1.30			29,364	100.00
	0-2	3595505	25,493	86.82	3,806	12.96	65	0.22	29,364	100.00
	0-1	3510034	28,977	98.68	387	1.32			29,364	100.00
	0-2	3595506	22,607	76.99	6,734	22.93	23	0.08	29,364	100.00
F	0-1	3509918	28,856	98.64	397	1.36			29,253	100.00
	0-2	3595500	25,455	87.02	3,740	12.79	58	0.20	29,253	100.00
	0-1	3509941	28,702	98.12	551	1.88			29,253	100.00
	0-2	3595501	24,531	83.86	4,641	15.87	81	0.28	29,253	100.00
	0-1	3509922	28,957	98.99	296	1.01			29,253	100.00
	0-2	3595507	25,756	88.05	3,485	11.91	12	0.04	29,253	100.00
	0-1	3510067	28,936	98.92	317	1.08			29,253	100.00
	0-2	3595508	23,218	79.37	5,962	20.38	73	0.25	29,253	100.00
	0-1	3509924	28,447	97.24	806	2.76			29,253	100.00
	0-2	3595509	26,659	91.13	2,565	8.77	29	0.10	29,253	100.00
	0-1	3510060	28,991	99.10	262	0.90			29,253	100.00
	0-2	3595505	26,556	90.78	2,686	9.18	11	0.04	29,253	100.00
	0-1	3509932	28,987	99.09	266	0.91			29,253	100.00
	0-2	3595510	25,775	88.11	3,453	11.80	25	0.09	29,253	100.00

Note. Analysis was conducted with a statewide population.

Table 4.40 The 2008 MSA-Mathematics Score Difference between Rater 1 and Rater 2: Grade 4

Form	Score Range	Item CID	Perfect		Adjacent		Discrepancy		Total	
			N	%	*N*	%	*N*	%	*N*	%
A	0-1	100000044148	29,337	97.46	764	2.54			30,101	100.00
	0-2	3595498	24,615	81.77	5,392	17.91	94	0.31	30,101	100.00
	0-1	100000044142	29,839	99.13	262	0.87			30,101	100.00
	0-2	3595499	26,966	89.59	3,110	10.33	25	0.08	30,101	100.00
	0-1	3515648	29,757	98.86	344	1.14			30,101	100.00
	0-2	3595531	24,378	80.99	5,588	18.56	135	0.45	30,101	100.00
	0-1	3515823	29,654	98.51	447	1.49			30,101	100.00
	0-2	3595532	25,398	84.38	4,660	15.48	43	0.14	30,101	100.00
	0-1	3515807	29,558	98.20	543	1.80			30,101	100.00
	0-2	3595533	24,790	82.36	5,238	17.4	73	0.24	30,101	100.00
	0-1	3515886	29,300	97.34	801	2.66			30,101	100.00
	0-2	3595534	24,981	82.99	5,078	16.87	42	0.14	30,101	100.00
	0-1	3515843	29,920	99.40	181	0.60			30,101	100.00
	0-2	3595535	27,292	90.67	2,775	9.22	34	0.11	30,101	100.00
F	0-1	3515595	29,692	99.19	241	0.81			29,933	100.00
	0-2	3595536	24,305	81.20	5,592	18.68	36	0.12	29,933	100.00
	0-1	100000044142	29,636	99.01	297	0.99			29,933	100.00
	0-2	3595499	26,746	89.35	3,159	10.55	28	0.09	29,933	100.00
	0-1	3515648	29,548	98.71	385	1.29			29,933	100.00
	0-2	3595531	24,103	80.52	5,697	19.03	133	0.44	29,933	100.00
	0-1	3515646	29,643	99.03	290	0.97			29,933	100.00
	0-2	3595537	27,755	92.72	2,094	7.00	84	0.28	29,933	100.00
	0-1	3515807	29,441	98.36	492	1.64			29,933	100.00
	0-2	3595533	25,592	85.50	4,315	14.42	26	0.09	29,933	100.00
	0-1	3515783	29,431	98.32	502	1.68			29,933	100.00
	0-2	3595560	25,342	84.66	4,520	15.10	71	0.24	29,933	100.00
	0-1	3515830	29,685	99.17	248	0.83			29,933	100.00
	0-2	3595561	24,710	82.55	5,136	17.16	87	0.29	29,933	100.00

Note. Analysis was conducted with a statewide population.

Table 4.41 The 2008 MSA-Mathematics Score Difference between Rater 1 and Rater 2: Grade 5

Form	Score Range	Item CID	Perfect		Adjacent		Discrepancy		Total	
			N	%	*N*	%	*N*	%	*N*	%
A	0-1	3511531	30,093	98.55	444	1.45			30,537	100.00
	0-2	3595438	25,124	82.27	5,314	17.4	99	0.32	30,537	100.00
	0-1	3512615	30,023	98.32	514	1.68			30,537	100.00
	0-2	3595439	21,983	71.99	8,477	27.76	77	0.25	30,537	100.00
	0-1	3511336	29,801	97.59	736	2.41			30,537	100.00
	0-2	3595440	27,584	90.33	2,939	9.62	14	0.05	30,537	100.00
	0-1	**3511258**	**30,277**	**99.15**	**260**	**0.85**			**30,537**	**100.00**
	0-3	**3595441**	**26,405**	**86.47**	**4,105**	**13.44**	**27**	**0.09**	**30,537**	**100.00**
	0-1	3556476	30,132	98.67	405	1.33			30,537	100.00
	0-2	3595442	27,317	89.46	3,117	10.21	103	0.34	30,537	100.00
	0-1	3512618	29,630	97.03	907	2.97			30,537	100.00
	0-2	3595443	25,424	83.26	5,109	16.73	4	0.01	30,537	100.00
	0-1	3512564	28,753	94.16	1,784	5.84			30,537	100.00
	0-2	3595444	26,014	85.19	4,481	14.67	42	0.14	30,537	100.00
	0-1	3512644	29,460	96.47	1,077	3.53			30,537	100.00
	0-2	3595445	25,035	81.98	5,391	17.65	111	0.36	30,537	100.00
F	0-1	3511531	29,877	98.64	412	1.36			30,289	100.00
	0-2	3595438	24,722	81.62	5,490	18.13	77	0.25	30,289	100.00
	0-1	3512615	29,746	98.21	543	1.79			30,289	100.00
	0-2	3595439	22,461	74.16	7,773	25.66	55	0.18	30,289	100.00
	0-1	3511336	29,568	97.62	721	2.38			30,289	100.00
	0-2	3595440	27,705	91.47	2,563	8.46	21	0.07	30,289	100.00
	0-1	**3511258**	**30,073**	**99.29**	**216**	**0.71**			**30,289**	**100.00**
	0-3	**3595441**	**26,892**	**88.78**	**3,377**	**11.15**	**20**	**0.07**	**30,289**	**100.00**
	0-1	3556476	29,949	98.88	340	1.12			30,289	100.00
	0-2	3595442	27,225	89.88	2,955	9.76	109	0.36	30,289	100.00
	0-1	3512618	29,513	97.44	776	2.56			30,289	100.00
	0-2	3595443	26,012	85.88	4,268	14.09	9	0.03	30,289	100.00
	0-1	3512564	28,765	94.97	1,524	5.03			30,289	100.00
	0-2	3595444	26,909	88.84	3,370	11.13	10	0.03	30,289	100.00
	0-1	3512644	29,342	96.87	947	3.13			30,289	100.00
	0-2	3595445	24,918	82.27	5,295	17.48	76	0.25	30,289	100.00

Note. Analysis was conducted with a statewide population.

Note. Bold-faced item indicates a ECR item.

Table 4.42 The 2008 MSA-Mathematics Score Difference between Rater 1 and Rater 2: Grade 6

Form	Score Range	Item CID	Perfect		Adjacent		Discrepancy		Total	
			N	%	*N*	%	*N*	%	*N*	%
A	**0-1**	**3517004**	**30,571**	**98.43**	**489**	**1.57**			**31,060**	**100.00**
	0-3	**3595446**	**20,420**	**65.74**	**9,897**	**31.86**	**743**	**2.39**	**31,060**	**100.00**
	0-1	3516627	30,488	98.16	572	1.84			31,060	100.00
	0-2	3595447	27,057	87.11	3,954	12.73	49	0.16	31,060	100.00
	0-1	3516363	30,748	99.00	312	1.00			31,060	100.00
	0-2	3595448	28,569	91.98	2,429	7.82	62	0.20	31,060	100.00
	0-1	3516333	30,270	97.46	790	2.54			31,060	100.00
	0-2	3595449	24,460	78.75	6,525	21.01	75	0.24	31,060	100.00
	0-1	3517013	30,442	98.01	618	1.99			31,060	100.00
	0-2	3595450	29,017	93.42	2,026	6.52	17	0.05	31,060	100.00
	0-1	3516616	30,633	98.63	427	1.37			31,060	100.00
	0-2	3595451	28,377	91.36	2,573	8.28	110	0.35	31,060	100.00
	0-1	3516913	30,808	99.19	252	0.81			31,060	100.00
	0-2	3595452	27,574	88.78	3,466	11.16	20	0.06	31,060	100.00
F	**0-1**	**3516923**	**29,905**	**98.72**	**387**	**1.28**			**30,292**	**100.00**
	0-3	**3595453**	**22,299**	**73.61**	**7,667**	**25.31**	**326**	**1.08**	**30,292**	**100.00**
	0-1	3516627	29,836	98.49	456	1.51			30,292	100.00
	0-2	3595447	26,727	88.23	3,524	11.63	41	0.14	30,292	100.00
	0-1	3516628	30,115	99.42	177	0.58			30,292	100.00
	0-2	3595454	28,331	93.53	1,940	6.40	21	0.07	30,292	100.00
	0-1	3516333	29,616	97.77	676	2.23			30,292	100.00
	0-2	3595449	24,317	80.28	5,906	19.5	69	0.23	30,292	100.00
	0-1	3517013	29,718	98.11	574	1.89			30,292	100.00
	0-2	3595450	28,500	94.08	1,781	5.88	11	0.04	30,292	100.00
	0-1	3516616	29,900	98.71	392	1.29			30,292	100.00
	0-2	3595451	27,874	92.02	2,339	7.72	79	0.26	30,292	100.00
	0-1	3516327	29,682	97.99	610	2.01			30,292	100.00
	0-2	3595455	26,200	86.49	3,905	12.89	187	0.62	30,292	100.00

Note. Analysis was conducted with a statewide population.

Note. Bold-faced item indicates a ECR item.

Table 4.43 The 2008 MSA-Mathematics Score Difference between Rater 1 and Rater 2: Grade 7

Form	Score Range	Item CID	Perfect		Adjacent		Discrepancy		Total	
			N	%	*N*	%	*N*	%	*N*	%
A	0-1	100000043334	31,557	99.22	247	0.78			31,804	100.00
	0-2	3595363	28,773	90.47	2,933	9.22	98	0.31	31,804	100.00
	0-1	**100000043348**	**31,128**	**97.87**	**676**	**2.13**			**31,804**	**100.00**
	0-3	**3595364**	**25,464**	**80.07**	**6,049**	**19.02**	**291**	**0.91**	**31,804**	**100.00**
	0-1	3517646	31,159	97.97	645	2.03			31,804	100.00
	0-2	3595365	28,223	88.74	3,288	10.34	293	0.92	31,804	100.00
	0-1	3517725	31,692	99.65	112	0.35			31,804	100.00
	0-2	3564022	30,084	94.59	1,690	5.31	30	0.09	31,804	100.00
	0-1	**100000043347**	**31,584**	**99.31**	**220**	**0.69**			**31,804**	**100.00**
	0-3	**3595366**	**29,326**	**92.21**	**2,449**	**7.70**	**29**	**0.09**	**31,804**	**100.00**
	0-1	**3517673**	**30,909**	**97.19**	**895**	**2.81**			**31,804**	**100.00**
	0-3	**3564020**	**27,100**	**85.21**	**4,621**	**14.53**	**83**	**0.26**	**31,804**	**100.00**
	0-1	3517878	30,994	97.45	810	2.55			31,804	100.00
	0-2	3595367	27,069	85.11	4,719	14.84	16	0.05	31,804	100.00
F	0-1	100000043335	30,802	99.21	246	0.79			31,048	100.00
	0-2	3595368	28,984	93.35	2,030	6.54	34	0.11	31,048	100.00
	0-1	**3487765**	**30,685**	**98.83**	**363**	**1.17**			**31,048**	**100.00**
	0-3	**3595369**	**25,451**	**81.97**	**5,361**	**17.27**	**236**	**0.76**	**31,048**	**100.00**
	0-1	3517610	30,675	98.80	373	1.20			31,048	100.00
	0-2	3595370	26,844	86.46	4,125	13.29	79	0.25	31,048	100.00
	0-1	100000048821	28,922	93.15	2,126	6.85			31,048	100.00
	0-2	3595371	27,324	88.01	3,707	11.94	17	0.05	31,048	100.00
	0-1	**3547487**	**30,827**	**99.29**	**221**	**0.71**			**31,048**	**100.00**
	0-3	**3564031**	**28,739**	**92.56**	**2,289**	**7.37**	**20**	**0.06**	**31,048**	**100.00**
	0-1	**3517648**	**30,615**	**98.61**	**433**	**1.39**			**31,048**	**100.00**
	0-3	**3564027**	**27,935**	**89.97**	**2,918**	**9.40**	**195**	**0.63**	**31,048**	**100.00**
	0-1	3517708	30,855	99.38	193	0.62			31,048	100.00
	0-2	3595372	28,263	91.03	2,741	8.83	44	0.14	31,048	100.00

Note. Analysis was conducted with a statewide population.

Note. Bold-faced item indicates an ECR item.

Table 4.44 The 2008 MSA-Mathematics Score Difference between Rater 1 and Rater 2: Grade 8

Form	Score Range	Item CID	Perfect		Adjacent		Discrepancy		Total	
			N	%	*N*	%	*N*	%	*N*	%
A	0-1	3514013	32,065	99.22	253	0.78			32,318	100.00
	0-2	3564107	28,376	87.80	3,904	12.08	38	0.12	32,318	100.00
	0-1	**3514702**	**32,114**	**99.37**	**204**	**0.63**			**32,318**	**100.00**
	0-3	**3564108**	**28,453**	**88.04**	**3,725**	**11.53**	**140**	**0.43**	**32,318**	**100.00**
	0-1	3514267	31,898	98.70	420	1.30			32,318	100.00
	0-2	3564110	27,746	85.85	4,443	13.75	129	0.40	32,318	100.00
	0-1	3514117	31,820	98.46	498	1.54			32,318	100.00
	0-2	3564111	27,454	84.95	4,755	14.71	109	0.34	32,318	100.00
	0-1	**3514607**	**32,131**	**99.42**	**187**	**0.58**			**32,318**	**100.00**
	0-3	**3564112**	**28,913**	**89.46**	**3,182**	**9.85**	**223**	**0.69**	**32,318**	**100.00**
	0-1	3514118	32,216	99.68	102	0.32			32,318	100.00
	0-2	3564113	30,306	93.77	2,007	6.21	5	0.02	32,318	100.00
	0-1	**100000043313**	**31,629**	**97.87**	**689**	**2.13**			**32,318**	**100.00**
	0-3	**3595405**	**27,484**	**85.04**	**4,466**	**13.82**	**368**	**1.14**	**32,318**	**100.00**
	0-1	3514669	32,042	99.15	276	0.85			32,318	100.00
	0-2	3564114	29,831	92.3	2,414	7.47	73	0.23	32,318	100.00
F	0-1	3514013	31,477	99.17	265	0.83			31,742	100.00
	0-2	3564107	28,662	90.30	3,047	9.60	33	0.10	31,742	100.00
	0-1	**3514283**	**31,573**	**99.47**	**169**	**0.53**			**31,742**	**100.00**
	0-3	**3564116**	**29,387**	**92.58**	**2,294**	**7.23**	**61**	**0.19**	**31,742**	**100.00**
	0-1	3514217	29,676	93.49	2,066	6.51			31,742	100.00
	0-2	3595406	26,554	83.66	5,183	16.33	5	0.02	31,742	100.00
	0-1	3514117	31,199	98.29	543	1.71			31,742	100.00
	0-2	3564111	27,344	86.14	4,312	13.58	86	0.27	31,742	100.00
	0-1	**3514607**	**31,571**	**99.46**	**171**	**0.54**			**31,742**	**100.00**
	0-3	**3564112**	**28,724**	**90.49**	**2,862**	**9.02**	**156**	**0.49**	**31,742**	**100.00**
	0-1	3514266	31,512	99.28	230	0.72			31,742	100.00
	0-2	3564120	27,560	86.83	4,141	13.05	41	0.13	31,742	100.00
	0-1	**100000043313**	**30,985**	**97.62**	**757**	**2.38**			**31,742**	**100.00**
	0-3	**3595405**	**27,378**	**86.25**	**4,099**	**12.91**	**265**	**0.83**	**31,742**	**100.00**
	0-1	3514709	31,431	99.02	311	0.98			31,742	100.00
	0-2	3595408	29,276	92.23	2,407	7.58	59	0.19	31,742	100.00

Note. Analysis was conducted with a statewide population.

Note. Bold-faced item indicates an ECR item.

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APPENDIX A: THE 2008 MSA-MATH STRATIFIED RANDOM SAMPLING

Reporting deadlines made it impossible to use almost 100% of the 2008 population as the 2008 calibration and equating data set, MSDE and NPC recommended that Pearson use equating samples instead of the 2008 population. Pearson chose Local Education Agency (LEA) as one of the most important variables for stratification. Based on the population percentage of each LEA, Pearson randomly selected about 3,000 students for each grade from first-waved documents (i.e., 50% of the statewide population) which were randomly distributed and completely scored. It should be noted that this method has been applied since the 2006 assessment.

To verify that the sample was representative of the statewide examinee population in terms of gender and ethnicity, the distributions of gender and ethnicity of the 2008 samples were compared with the 2008 population. The results are shown in this appendix. The percentages of male and female students were within 2.5 percentage points of the target values across all grades. The percentages of students from the five major ethnic groups were all within 2 percentage points of the target values across all grades. We conclude that the 2008 equating samples were representative of the 2008 statewide examinee population in terms of LEA, gender, and ethnicity.

Table A.1 2008 MSA-Math Population and Stratified Random Sampling (S.R.S.): Grade 3 LEA

LEA	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
1	1.08	32	1.07	0.01	1.08	32	1.07	0.01
2	8.92	268	8.99	-0.07	8.92	268	8.94	-0.02
3	12.59	378	12.68	-0.09	12.59	378	12.60	-0.01
4	2.00	60	2.01	-0.01	2.00	60	2.00	0.00
5	0.58	18	0.60	-0.02	0.58	18	0.60	-0.02
6	3.18	95	3.19	-0.01	3.18	95	3.17	0.01
7	1.97	59	1.98	-0.01	1.97	59	1.97	0.00
8	2.88	86	2.88	0.00	2.88	86	2.87	0.01
9	0.51	15	0.50	0.01	0.51	15	0.50	0.01
10	4.80	144	4.83	-0.03	4.80	144	4.80	0.00
11	0.53	16	0.54	-0.01	0.53	16	0.53	0.00
12	4.71	141	4.73	-0.02	4.71	141	4.70	0.01
13	5.75	172	5.77	-0.02	5.75	172	5.74	0.01
14	0.26	8	0.27	-0.01	0.26	8	0.27	-0.01
15	16.26	488	16.37	-0.11	16.26	488	16.27	-0.01
16	14.53	436	14.63	-0.10	14.53	436	14.54	-0.01
17	0.90	27	0.91	-0.01	0.90	27	0.90	0.00
18	1.99	60	2.01	-0.02	1.99	60	2.00	-0.01
19	0.35	0	0.00	0.35	0.35	10	0.33	0.02
20	0.48	15	0.50	-0.02	0.48	15	0.5	-0.02
21	2.68	80	2.68	0.00	2.68	80	2.67	0.01
22	1.92	58	1.95	-0.03	1.92	58	1.93	-0.01
23	0.77	15	0.50	0.27	0.77	23	0.77	0.00
24	0.21	6	0.20	0.01	0.21	6	0.20	0.01
30	10.13	304	10.20	-0.07	10.13	304	10.14	-0.01
Total	100.00	2,981	100.00	0.00	100.00	2,999	100.00	0.00

Note. 1. Allegany; 2. Anne Arundel; 3. Baltimore; 4. Calvert; 5. Caroline; 6. Carroll; 7. Cecil; 8. Charles; 9. Dorchester; 10. Frederick; 11. Garrett; 12. Harford; 13. Howard; 14. Kent; 15. Montgomery; 16. Prince George's; 17. Queen Anne's; 18. St. Mary's; 19. Somerset; 20. Talbot; 21. Washington; 22. Wicomico; 23. Worcester; 24. LEA 24; 30. Baltimore City; 31. Edison Partnership

Table A.2 2008 MSA-Math Population and Stratified Random Sampling (S.R.S.): Grade 3 Ethnicity

Race	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
1	0.41	11	0.37	0.04	0.41	13	0.43	-0.02
2	5.92	172	5.77	0.15	5.92	178	5.94	-0.02
3	37.75	1131	37.94	-0.19	37.75	1119	37.31	0.43
4	46.31	1373	46.06	0.25	46.31	1419	47.32	-1.01
5	9.42	288	9.66	-0.24	9.42	264	8.80	0.61
Miss	0.20	6	0.20	0.00	0.20	6	0.20	0.00
Total	100.00	2,981	100.00	0.00	100.00	2,999	100.00	0.00

Note. 1. American Indian; 2. Asian American; 3. African American; 4. White; 5. Hispanic; Miss: Missing

Table A.3 2008 MSA- Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 3 Gender

Gender	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
F	51.35	1492	50.05	1.30	51.35	1545	51.52	-0.17
M	48.49	1486	49.85	-1.36	48.49	1447	48.25	0.24
Miss	0.16	3	0.10	0.06	0.16	7	0.23	-0.08
Total	100.00	2,981	100.00	0.00	100.00	2,999	100.00	0.00

Note. F. Female; M. Male; Miss: Missing

Table A.4 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 4 LEA

LEA	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
1	1.11	33	1.10	0.01	1.11	33	1.10	0.01
2	9.04	271	9.06	-0.02	9.04	271	9.04	0.00
3	12.34	370	12.37	-0.03	12.34	370	12.35	-0.01
4	2.05	61	2.04	0.01	2.05	61	2.04	0.01
5	0.60	18	0.60	0.00	0.60	18	0.60	0.00
6	3.37	101	3.38	-0.01	3.37	101	3.37	0.00
7	2.02	61	2.04	-0.02	2.02	61	2.04	-0.02
8	3.04	91	3.04	0.00	3.04	91	3.04	0.00
9	0.46	14	0.47	-0.01	0.46	14	0.47	-0.01
10	4.85	145	4.85	0.00	4.85	145	4.84	0.01
11	0.53	16	0.53	0.00	0.53	16	0.53	0.00
12	4.79	144	4.81	-0.02	4.79	144	4.80	-0.01
13	6.06	182	6.08	-0.02	6.06	182	6.07	-0.01
14	0.24	7	0.23	0.01	0.24	7	0.23	0.01
15	16.06	482	16.11	-0.05	16.06	482	16.08	-0.02
16	14.75	442	14.77	-0.02	14.75	442	14.75	0.00
17	0.88	26	0.87	0.01	0.88	26	0.87	0.01
18	1.91	57	1.91	0.00	1.91	57	1.90	0.01
19	0.28	8	0.27	0.01	0.28	8	0.27	0.01
20	0.48	14	0.47	0.01	0.48	14	0.47	0.01
21	2.64	79	2.64	0.00	2.64	79	2.64	0.00
22	1.83	55	1.84	-0.01	1.83	55	1.84	-0.01
23	0.74	17	0.57	0.17	0.74	22	0.73	0.01
24	0.26	8	0.27	-0.01	0.26	8	0.27	-0.01
30	9.66	290	9.69	-0.03	9.66	290	9.68	-0.02
Total	100.00	2,992	100.01	-0.01	100.00	2,997	100.02	-0.02

Note. 1. Allegany; 2. Anne Arundel; 3. Baltimore; 4. Calvert; 5. Caroline; 6. Carroll; 7. Cecil; 8. Charles; 9. Dorchester; 10. Frederick; 11. Garrett; 12. Harford; 13. Howard; 14. Kent; 15. Montgomery; 16. Prince George's; 17. Queen Anne's; 18. St. Mary's; 19. Somerset; 20. Talbot; 21. Washington; 22. Wicomico; 23. Worcester; 24. LEA 24; 30. Baltimore City; 31. Edison Partnership

Table A.5 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 4 Ethnicity

Race	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
1	0.39	15	0.50	-0.11	0.39	10	0.33	0.06
2	5.89	176	5.88	0.00	5.89	159	5.31	0.58
3	37.53	1135	37.93	-0.40	37.53	1129	37.67	-0.14
4	46.85	1370	45.79	1.06	46.85	1400	46.71	0.14
5	9.13	292	9.76	-0.63	9.13	291	9.71	-0.58
Miss	0.20	4	0.13	0.07	0.20	8	0.27	-0.06
Total	100.00	2,992	100.00	0.00	100.00	2,997	100.00	0.00

Note. 1. American Indian; 2. Asian American; 3. African American; 4. White; 5. Hispanic; Miss: Missing

Table A.6 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 4 Gender

Gender	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
F	50.90	1479	49.43	1.47	50.90	1538	51.32	-0.42
M	48.95	1509	50.43	-1.48	48.95	1453	48.48	0.47
Miss	0.15	4	0.13	0.01	0.15	6	0.20	-0.05
Total	100.00	2,992	100.00	0.00	100.00	2,997	100.00	0.00

Note. F. Female; M. Male; Miss: Missing

Table A.7 2008 MSA-Math Population and Stratified Random Sampling (S.R.S.): Grade 5 LEA

LEA	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
1	1.11	33	1.11	0.00	1.11	33	1.13	-0.02
2	8.80	264	8.89	-0.09	8.80	264	9.04	-0.24
3	12.23	367	12.36	-0.13	12.23	367	12.56	-0.33
4	2.02	61	2.05	-0.03	2.02	61	2.09	-0.07
5	0.71	21	0.71	0.00	0.71	21	0.72	-0.01
6	3.26	98	3.30	-0.04	3.26	98	3.36	-0.10
7	1.92	58	1.95	-0.03	1.92	58	1.99	-0.07
8	3.23	97	3.27	-0.04	3.23	97	3.32	-0.09
9	0.58	17	0.57	0.01	0.58	17	0.58	0.00
10	4.84	145	4.88	-0.04	4.84	145	4.96	-0.12
11	0.50	15	0.51	-0.01	0.50	15	0.51	-0.01
12	4.81	144	4.85	-0.04	4.81	144	4.93	-0.12
13	6.12	183	6.16	-0.04	6.12	183	6.26	-0.14
14	0.27	8	0.27	0.00	0.27	8	0.27	0.00
15	16.31	489	16.47	-0.16	16.31	420	14.38	1.93
16	14.93	448	15.09	-0.16	14.93	448	15.34	-0.41
17	0.90	27	0.91	-0.01	0.90	27	0.92	-0.02
18	2.04	61	2.05	-0.01	2.04	61	2.09	-0.05
19	0.30	2	0.07	0.23	0.30	1	0.03	0.27
20	0.48	14	0.47	0.01	0.48	14	0.48	0.00
21	2.67	80	2.69	-0.02	2.67	80	2.74	-0.07
22	1.86	56	1.89	-0.03	1.86	56	1.92	-0.06
23	0.75	0	0	0.75	0.75	22	0.75	0.00
24	0.29	9	0.30	-0.01	0.29	9	0.31	-0.02
30	9.07	272	9.16	-0.09	9.07	272	9.31	-0.24
Total	100.00	2,969	99.98	0.02	100.00	2,921	99.99	0.01

Note. 1. Allegany; 2. Anne Arundel; 3. Baltimore; 4. Calvert; 5. Caroline; 6. Carroll; 7. Cecil; 8. Charles; 9. Dorchester; 10. Frederick; 11. Garrett; 12. Harford; 13. Howard; 14. Kent; 15. Montgomery; 16. Prince George's; 17. Queen Anne's; 18. St. Mary's; 19. Somerset; 20. Talbot; 21. Washington; 22. Wicomico; 23. Worcester; 24. LEA 24; 30. Baltimore City; 31. Edison Partnership

Table A.8 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 5 Ethnicity

Race	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
1	0.37	5	0.17	0.20	0.37	15	0.51	-0.15
2	5.91	161	5.42	0.49	5.91	181	6.20	-0.29
3	37.34	1160	39.07	-1.73	37.34	1074	36.77	0.57
4	46.95	1365	45.98	0.97	46.95	1402	48.00	-1.05
5	9.25	277	9.33	-0.08	9.25	241	8.25	1.00
Miss	0.18	1	0.03	0.15	0.18	8	0.27	-0.09
Total	100.00	2,969	100.00	0.00	100.00	2,921	100.00	0.00

Note. 1. American Indian; 2. Asian American; 3. African American; 4. White; 5. Hispanic; Miss: Missing

Table A.9 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 5 Gender

Gender	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
F	51.32	1514	50.99	0.32	51.32	1464	50.12	1.20
M	48.53	1453	48.94	-0.41	48.53	1451	49.67	-1.15
Miss	0.15	2	0.07	0.09	0.15	6	0.21	-0.05
Total	100.00	2,969	100.00	0.00	100.00	2,921	100.00	0.00

Note. F. Female; M. Male; Miss: Missing

Table A.10 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 6 LEA

LEA	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
1	1.06	32	1.07	-0.01	1.06	32	1.07	-0.01
2	8.84	265	8.83	0.01	8.84	265	8.84	0.00
3	12.23	367	12.23	0.00	12.23	367	12.25	-0.02
4	2.16	65	2.17	-0.01	2.16	65	2.17	-0.01
5	0.59	18	0.60	-0.01	0.59	18	0.60	-0.01
6	3.49	105	3.50	-0.01	3.49	105	3.50	-0.01
7	1.97	59	1.97	0.00	1.97	59	1.97	0.00
8	3.25	97	3.23	0.02	3.25	97	3.24	0.01
9	0.52	16	0.53	-0.01	0.52	16	0.53	-0.01
10	4.93	148	4.93	0.00	4.93	148	4.94	-0.01
11	0.53	16	0.53	0.00	0.53	16	0.53	0.00
12	4.83	145	4.83	0.00	4.83	145	4.84	-0.01
13	6.22	186	6.20	0.02	6.22	186	6.21	0.01
14	0.23	7	0.23	0.00	0.23	7	0.23	0.00
15	15.78	473	15.76	0.02	15.78	473	15.78	0.00
16	15.32	460	15.32	0.00	15.32	460	15.35	-0.03
17	1.02	31	1.03	-0.01	1.02	31	1.03	-0.01
18	1.97	59	1.97	0.00	1.97	59	1.97	0.00
19	0.36	11	0.37	-0.01	0.36	11	0.37	-0.01
20	0.53	16	0.53	0.00	0.53	16	0.53	0.00
21	2.66	80	2.66	0.00	2.66	80	2.67	-0.01
22	1.53	46	1.53	0.00	1.53	46	1.53	0.00
23	0.74	22	0.73	0.01	0.74	22	0.73	0.01
24	0.39	12	0.40	-0.01	0.39	7	0.23	0.16
30	8.86	266	8.86	0.00	8.86	266	8.88	-0.02
Total	100.00	3,002	100.01	-0.01	100.00	2,997	99.99	0.01

Note. 1. Allegany; 2. Anne Arundel; 3. Baltimore; 4. Calvert; 5. Caroline; 6. Carroll; 7. Cecil; 8. Charles; 9. Dorchester; 10. Frederick; 11. Garrett; 12. Harford; 13. Howard; 14. Kent; 15. Montgomery; 16. Prince George's; 17. Queen Anne's; 18. St. Mary's; 19. Somerset; 20. Talbot; 21. Washington; 22. Wicomico; 23. Worcester; 24. LEA 24; 30. Baltimore City; 31. Edison Partnership

Table A.11 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 6 Ethnicity

Race	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
1	0.31	16	0.53	-0.22	0.31	8	0.27	0.05
2	5.68	156	5.20	0.49	5.68	177	5.91	-0.22
3	37.25	1150	38.31	-1.06	37.25	1124	37.50	-0.26
4	47.44	1421	47.34	0.10	47.44	1432	47.78	-0.34
5	9.04	244	8.13	0.91	9.04	249	8.31	0.73
Miss	0.28	15	0.50	-0.22	0.28	7	0.23	0.05
Total	100.00	3,002	100.00	0.00	100.00	2,997	100.00	0.00

Note. 1. American Indian; 2. Asian American; 3. African American; 4. White; 5. Hispanic; Miss: Missing

Table A.12 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 6 Gender

Gender	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
F	50.82	1581	52.66	-1.85	50.82	1502	50.12	0.70
M	48.94	1408	46.90	2.04	48.94	1490	49.72	-0.78
Miss	0.24	13	0.43	-0.19	0.24	5	0.17	0.07
Total	100.00	3,002	100.00	0.00	100.00	2,997	100.00	0.00

Note. F. Female; M. Male; Miss: Missing

Table A.13 2008 MSA-Math Population and Stratified Random Sampling (S.R.S.): Grade 7 LEA

LEA	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
1	1.06	32	1.09	-0.03	1.06	32	1.07	-0.01
2	8.81	264	9.02	-0.21	8.81	264	8.84	-0.03
3	12.29	369	12.61	-0.32	12.29	369	12.36	-0.07
4	2.17	65	2.22	-0.05	2.17	65	2.18	-0.01
5	0.64	19	0.65	-0.01	0.64	19	0.64	0.00
6	3.37	101	3.45	-0.08	3.37	101	3.38	-0.01
7	1.97	59	2.02	-0.05	1.97	59	1.98	-0.01
8	3.26	98	3.35	-0.09	3.26	98	3.28	-0.02
9	0.51	15	0.51	0.00	0.51	15	0.50	0.01
10	4.99	150	5.13	-0.14	4.99	150	5.03	-0.04
11	0.57	17	0.58	-0.01	0.57	17	0.57	0.00
12	4.79	144	4.92	-0.13	4.79	144	4.82	-0.03
13	6.52	195	6.66	-0.14	6.52	195	6.53	-0.01
14	0.25	8	0.27	-0.02	0.25	8	0.27	-0.02
15	16.33	427	14.59	1.74	16.33	490	16.42	-0.09
16	14.80	444	15.17	-0.37	14.80	444	14.87	-0.07
17	0.91	27	0.92	-0.01	0.91	27	0.90	0.01
18	1.89	57	1.95	-0.06	1.89	57	1.91	-0.02
19	0.36	3	0.10	0.26	0.36	0	0	0.36
20	0.50	15	0.51	-0.01	0.50	15	0.50	0.00
21	2.43	73	2.49	-0.06	2.43	73	2.45	-0.02
22	1.49	45	1.54	-0.05	1.49	45	1.51	-0.02
23	0.72	22	0.75	-0.03	0.72	22	0.74	-0.02
24	0.51	11	0.38	0.13	0.51	10	0.34	0.17
30	8.85	266	9.09	-0.24	8.85	266	8.91	-0.06
Total	100.00	2,926	99.97	0.03	100.00	2,985	100.00	0.00

Note. 1. Allegany; 2. Anne Arundel; 3. Baltimore; 4. Calvert; 5. Caroline; 6. Carroll; 7. Cecil; 8. Charles; 9. Dorchester; 10. Frederick; 11. Garrett; 12. Harford; 13. Howard; 14. Kent; 15. Montgomery; 16. Prince George's; 17. Queen Anne's; 18. St. Mary's; 19. Somerset; 20. Talbot; 21. Washington; 22. Wicomico; 23. Worcester; 24. LEA 24; 30. Baltimore City

Table A.14 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 7 Ethnicity

Race	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
1	0.41	9	0.31	0.10	0.41	5	0.17	0.24
2	5.52	139	4.75	0.77	5.52	175	5.86	-0.34
3	37.92	1133	38.72	-0.81	37.92	1156	38.73	-0.81
4	47.45	1394	47.64	-0.20	47.45	1380	46.23	1.22
5	8.53	246	8.41	0.12	8.53	260	8.71	-0.18
Miss	0.18	5	0.17	0.01	0.18	9	0.30	-0.12
Total	100.00	2,926	100.00	0.00	100.00	2,985	100.00	0.00

Note. 1. American Indian; 2. Asian American; 3. African American; 4. White; 5. Hispanic; Miss: Missing

Table A.15 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 7 Gender

Gender	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
F	51.25	1435	49.04	2.20	51.25	1460	48.91	2.34
M	48.64	1488	50.85	-2.22	48.64	1522	50.99	-2.35
Miss	0.11	3	0.10	0.01	0.11	3	0.10	0.01
Total	100.00	2,926	100.00	0.00	100.00	2,985	100.00	0.00

Note. F. Female; M. Male; Miss: Missing

Table A.16 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 8 LEA

LEA	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
1	1.01	30	1.00	0.01	1.01	30	1.00	0.01
2	8.55	257	8.60	-0.05	8.55	257	8.59	-0.04
3	12.19	366	12.24	-0.05	12.19	366	12.24	-0.05
4	2.08	62	2.07	0.01	2.08	62	2.07	0.01
5	0.63	19	0.64	-0.01	0.63	19	0.64	-0.01
6	3.51	105	3.51	0.00	3.51	105	3.51	0.00
7	1.97	59	1.97	0.00	1.97	59	1.97	0.00
8	3.35	101	3.38	-0.03	3.35	101	3.38	-0.03
9	0.57	17	0.57	0.00	0.57	17	0.57	0.00
10	4.71	141	4.72	-0.01	4.71	141	4.71	0.00
11	0.57	17	0.57	0.00	0.57	17	0.57	0.00
12	4.70	141	4.72	-0.02	4.70	141	4.71	-0.01
13	6.06	182	6.09	-0.03	6.06	182	6.08	-0.02
14	0.25	8	0.27	-0.02	0.25	8	0.27	-0.02
15	16.09	483	16.16	-0.07	16.09	483	16.15	-0.06
16	15.52	466	15.59	-0.07	15.52	466	15.58	-0.06
17	0.98	29	0.97	0.01	0.98	29	0.97	0.01
18	2.03	61	2.04	-0.01	2.03	61	2.04	-0.01
19	0.32	0	0	0.32	0.32	0	0	0.32
20	0.50	15	0.50	0.00	0.50	15	0.50	0.00
21	2.54	76	2.54	0.00	2.54	76	2.54	0.00
22	1.54	46	1.54	0.00	1.54	46	1.54	0.00
23	0.82	25	0.84	-0.02	0.82	25	0.84	-0.02
24	0.71	19	0.64	0.07	0.71	21	0.70	0.01
30	8.79	264	8.83	-0.04	8.79	264	8.83	-0.04
Total	100.00	2,989	100.00	0.00	100.00	2,991	100.00	0.00

Note. 1. Allegany; 2. Anne Arundel; 3. Baltimore; 4. Calvert; 5. Caroline; 6. Carroll; 7. Cecil; 8. Charles; 9. Dorchester; 10. Frederick; 11. Garrett; 12. Harford; 13. Howard; 14. Kent; 15. Montgomery; 16. Prince George's; 17. Queen Anne's; 18. St. Mary's; 19. Somerset; 20. Talbot; 21. Washington; 22. Wicomico; 23. Worcester; 24. LEA 24; 30. Baltimore City

Table A.17 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 8 Ethnicity

Race	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
1	0.41	13	0.43	-0.03	0.41	12	0.40	0.00
2	5.37	145	4.85	0.52	5.37	169	5.65	-0.28
3	38.85	1161	38.84	0.01	38.85	1173	39.22	-0.36
4	47.08	1374	45.97	1.11	47.08	1385	46.31	0.78
5	8.10	289	9.67	-1.57	8.10	246	8.22	-0.13
Miss	0.20	7	0.23	-0.04	0.20	6	0.20	0.00
Total	100.00	2,989	100.00	0.00	100.00	2,991	100.00	0.00

Note. 1. American Indian; 2. Asian American; 3. African American; 4. White; 5. Hispanic; Miss: Missing

Table A.18 2008 MSA-Mathematics Population and Stratified Random Sampling (S.R.S.): Grade 8 Gender

Gender	Operational Form A				Operational Form F			
	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.	2008 Pop. %	2008 S. R. S.	% of 2008 S. R. S.	% of Differ.
F	51.38	1585	53.03	-1.65	51.38	1514	50.62	0.76
M	48.49	1398	46.77	1.72	48.49	1473	49.25	-0.75
Miss	0.12	6	0.20	-0.08	0.12	4	0.13	-0.01
Total	100.00	2,989	100.00	0.00	100.00	2,991	100.00	0.00

Note. F. Female; M. Male; Miss: Missing

APPENDIX B: SCALE SCORE HISTOGRAMS AND TUKEY CHARTS

Year 2006 Grade=3

Scale Score Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
240		95	95	0.16	0.16
250		1	96	0.00	0.16
260		4	100	0.01	0.17
270		10	110	0.02	0.18
280		41	151	0.07	0.25
290		72	223	0.12	0.37
300	*	145	368	0.24	0.61
310	**	346	714	0.57	1.18
320	***	534	1248	0.88	2.07
330	*****	916	2164	1.52	3.58
340	******	1280	3444	2.12	5.70
350	**********	2048	5492	3.39	9.09
360	**********	2468	7960	4.09	13.18
370	**********	3688	11648	6.11	19.29
380	**********	3427	15075	5.67	24.96
390	**********	5747	20822	9.52	34.48
400	**********	5315	26137	8.80	43.28
410	**********	5395	31532	8.93	52.22
420	**********	5367	36899	8.89	61.10
430	**********	5016	41915	8.31	69.41
440	**********	5384	47299	8.92	78.33
450	**********	4014	51313	6.65	84.97
460	**********	3395	54708	5.62	90.59
470	**********	1942	56650	3.22	93.81
480	********	1520	58170	2.52	96.33
490	******	1120	59290	1.85	98.18
500	**	355	59645	0.59	98.77
510	**	316	59961	0.52	99.29
520	*	161	60122	0.27	99.56
530	*	148	60270	0.25	99.80
540		0	60270	0.00	99.80
550		53	60323	0.09	99.89
560		48	60371	0.08	99.97
570		0	60371	0.00	99.97
580		6	60377	0.01	99.98
590		11	60388	0.02	100.00
600		0	60388	0.00	100.00
610		0	60388	0.00	100.00
620		0	60388	0.00	100.00
630		0	60388	0.00	100.00
640		0	60388	0.00	100.00
650		0	60388	0.00	100.00

1000 2000 3000 4000 5000

Frequency

Figure B.1 Year 2006 Scale Score Distribution: Grade 3

Year 2008 Grade=3 Form=A

Scale Score Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
240		10	10	0.03	0.03
250		4	14	0.01	0.05
260		5	19	0.02	0.06
270		10	29	0.03	0.10
280		6	35	0.02	0.12
290		11	46	0.04	0.16
300	*	55	101	0.19	0.34
310	*	60	161	0.20	0.55
320	**	166	327	0.57	1.11
330	*****	376	703	1.28	2.39
340	*******	545	1248	1.86	4.25
350	**********	774	2022	2.64	6.89
360	**********	1049	3071	3.57	10.46
370	**********	1341	4412	4.57	15.03
380	**********	2449	6861	8.34	23.37
390	**********	1746	8607	5.95	29.31
400	**********	2836	11443	9.66	38.97
410	**********	3429	14872	11.68	50.65
420	**********	2931	17803	9.98	60.63
430	**********	3043	20846	10.36	70.99
440	**********	2022	22868	6.89	77.88
450	**********	1960	24828	6.67	84.55
460	**********	1779	26607	6.06	90.61
470	**********	725	27332	2.47	93.08
480	**********	1154	28486	3.93	97.01
490	*****	405	28891	1.38	98.39
500	***	230	29121	0.78	99.17
510		0	29121	0.00	99.17
520	**	164	29285	0.56	99.73
530		0	29285	0.00	99.73
540		0	29285	0.00	99.73
550	*	58	29343	0.20	99.93
560		0	29343	0.00	99.93
570		21	29364	0.07	100.00
580		0	29364	0.00	100.00
590		0	29364	0.00	100.00
600		0	29364	0.00	100.00
610		0	29364	0.00	100.00
620		0	29364	0.00	100.00
630		0	29364	0.00	100.00
640		0	29364	0.00	100.00
650		0	29364	0.00	100.00

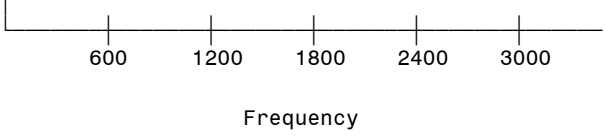


Figure B.2 Year 2008 Scale Score Distribution: Grade 3 Form A

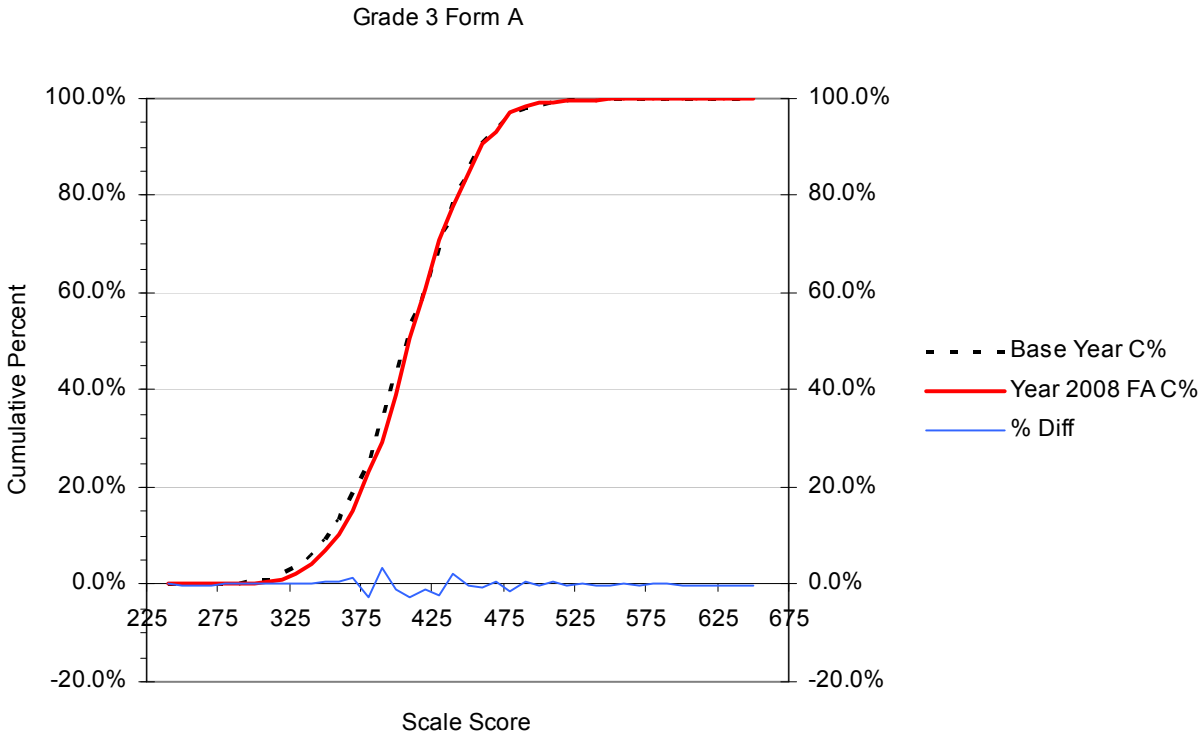


Figure B.3 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Percent Differences between CDFs: Grade 3 Form A

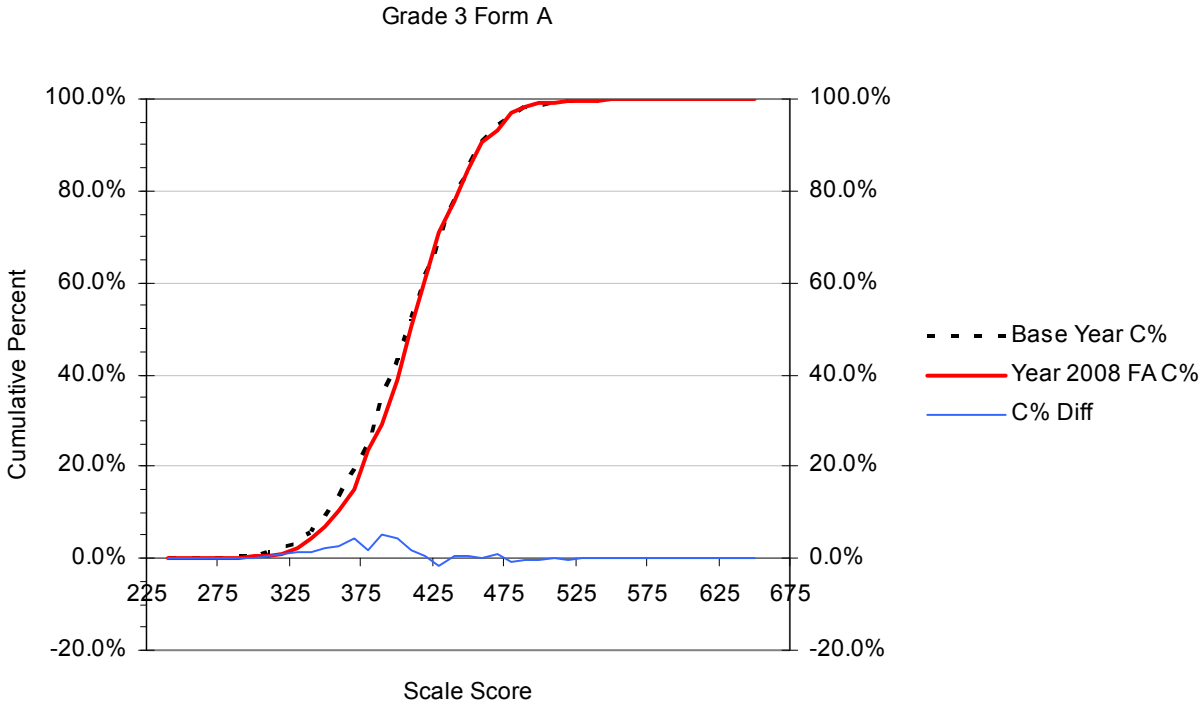


Figure B.4 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Cumulative Percent Differences between CDFs: Grade 3 Form A

Year 2008 Grade=3 Form=F

Scale Score Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
240		5	5	0.02	0.02
250		3	8	0.01	0.03
260		8	16	0.03	0.05
270		10	26	0.03	0.09
280		6	32	0.02	0.11
290		8	40	0.03	0.14
300	*	40	80	0.14	0.27
310	*	82	162	0.28	0.55
320	**	157	319	0.54	1.09
330	****	296	615	1.01	2.10
340	******	476	1091	1.63	3.73
350	**********	764	1855	2.61	6.34
360	**********	1048	2903	3.58	9.92
370	**********	1276	4179	4.36	14.29
380	**********	1739	5918	5.94	20.23
390	**********	2200	8118	7.52	27.75
400	**********	2837	10955	9.70	37.45
410	**********	2636	13591	9.01	46.46
420	**********	2944	16535	10.06	56.52
430	**********	2239	18774	7.65	64.18
440	**********	2415	21189	8.26	72.43
450	**********	2388	23577	8.16	80.60
460	**********	2240	25817	7.66	88.25
470	**********	987	26804	3.37	91.63
480	**********	832	27636	2.84	94.47
490	********	621	28257	2.12	96.60
500	******	468	28725	1.60	98.20
510	****	297	29022	1.02	99.21
520		0	29022	0.00	99.21
530	**	153	29175	0.52	99.73
540		0	29175	0.00	99.73
550		0	29175	0.00	99.73
560	*	65	29240	0.22	99.96
570		0	29240	0.00	99.96
580		0	29240	0.00	99.96
590		13	29253	0.04	100.00
600		0	29253	0.00	100.00
610		0	29253	0.00	100.00
620		0	29253	0.00	100.00
630		0	29253	0.00	100.00
640		0	29253	0.00	100.00
650		0	29253	0.00	100.00

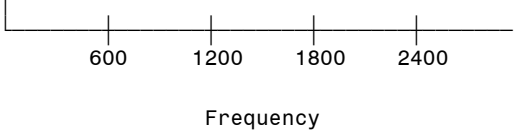


Figure B.5 Year 2008 Scale Score Distribution: Grade 3 Form F

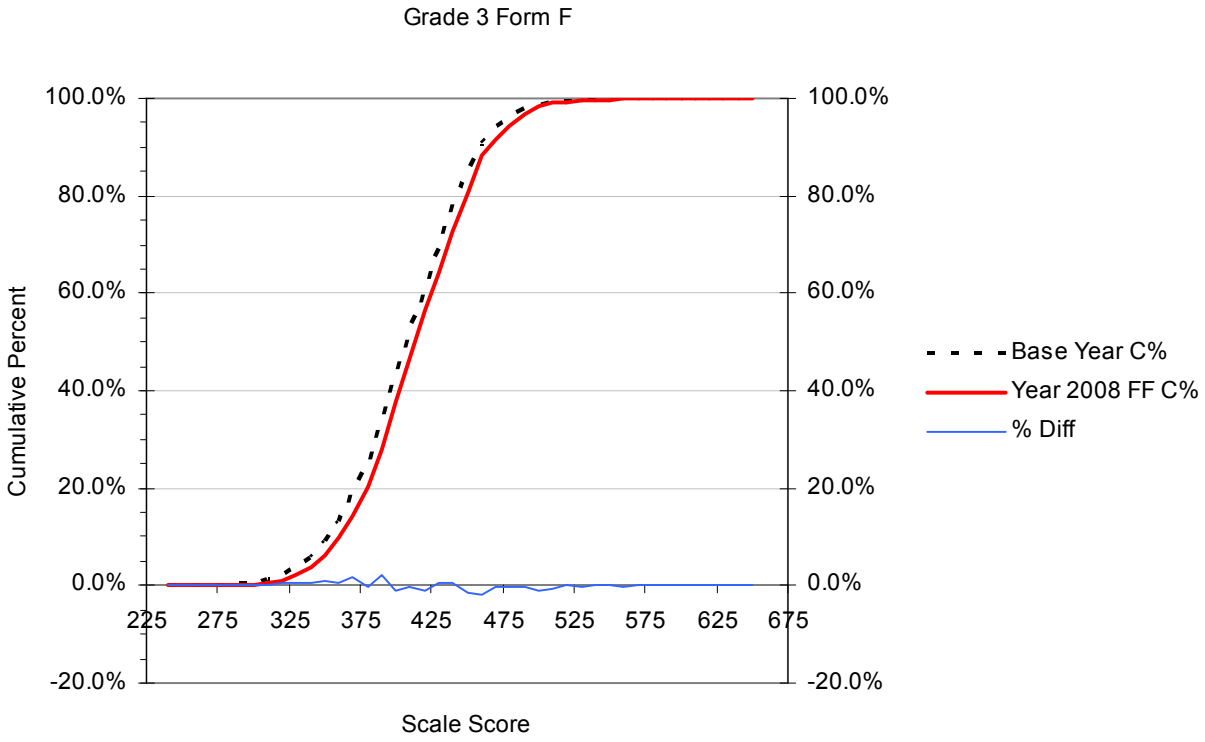


Figure B.6 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Percent Differences between CDFs: Grade 3 Form F

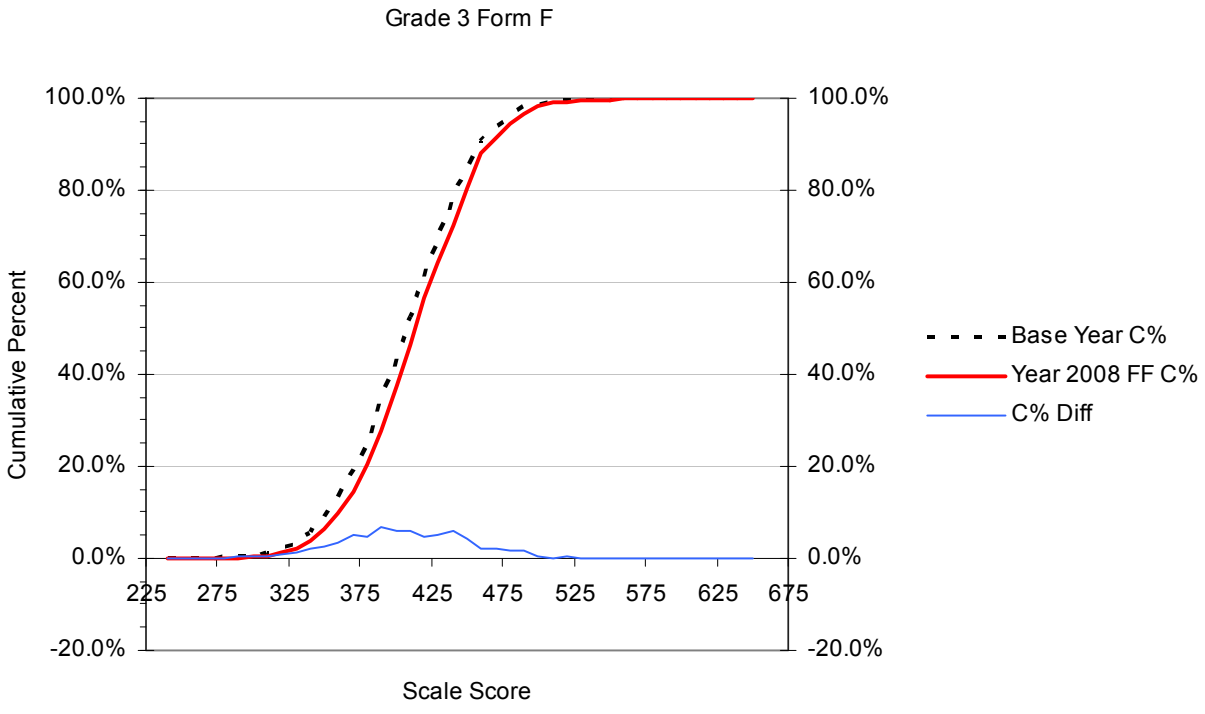


Figure B.7 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Cumulative Percent Differences between CDFs: Grade 3 Form F

Year 2006 Grade=4

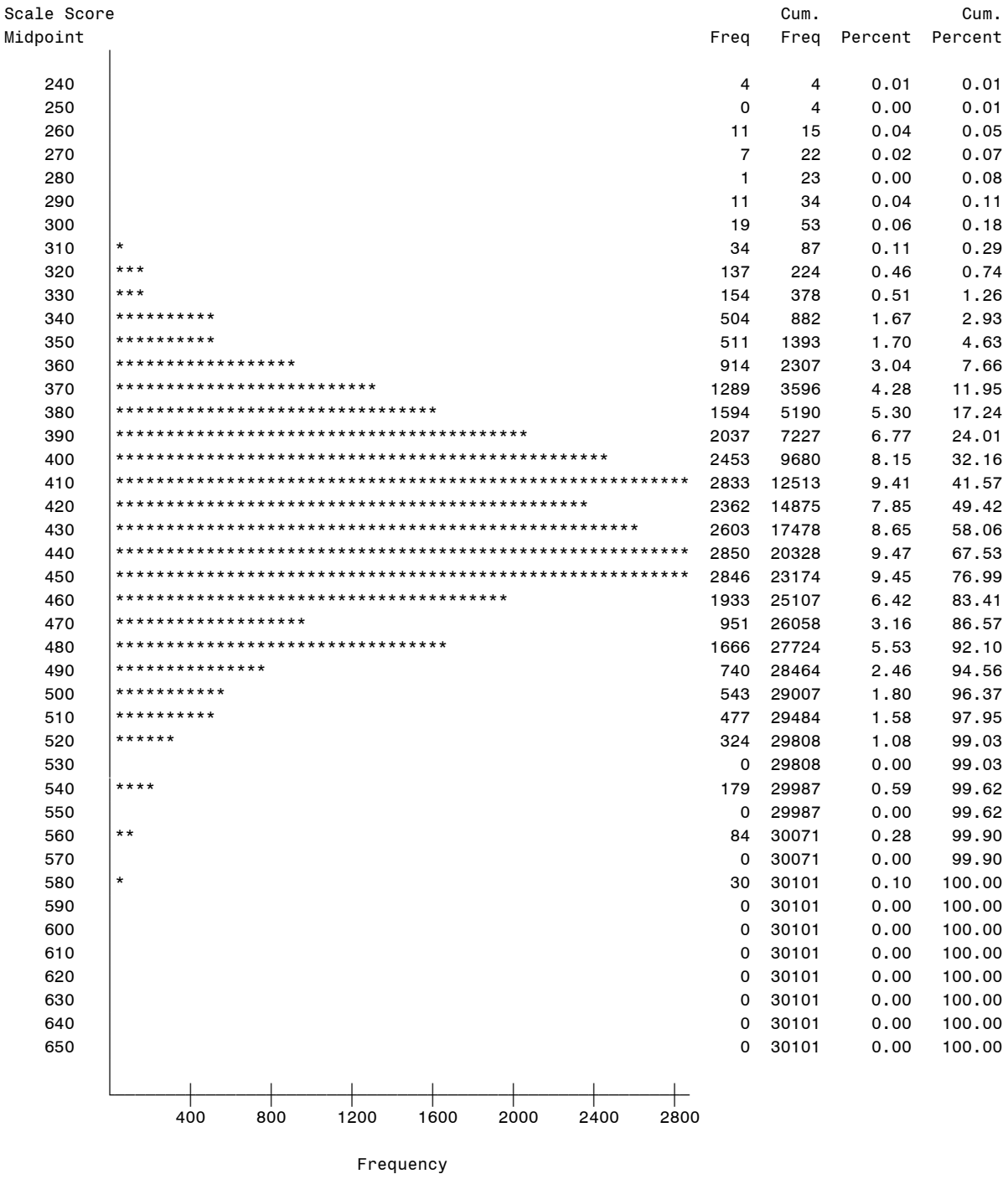
Scale Score Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
240		91	91	0.15	0.15
250		3	94	0.00	0.15
260		0	94	0.00	0.15
270		6	100	0.01	0.16
280		14	114	0.02	0.18
290		13	127	0.02	0.21
300		48	175	0.08	0.28
310	*	107	282	0.17	0.46
320	**	372	654	0.60	1.06
330	****	772	1426	1.25	2.31
340	******	1174	2600	1.90	4.21
350	**********	2280	4880	3.69	7.90
360	**********	2953	7833	4.78	12.68
370	**********	3412	11245	5.52	18.20
380	**********	4058	15303	6.57	24.77
390	**********	4779	20082	7.73	32.50
400	**********	5250	25332	8.50	41.00
410	**********	5866	31198	9.49	50.49
420	**********	6417	37615	10.39	60.88
430	**********	5633	43248	9.12	70.00
440	**********	5088	48336	8.24	78.23
450	**********	3460	51796	5.60	83.83
460	**********	3329	55125	5.39	89.22
470	**********	2812	57937	4.55	93.77
480	********	1618	59555	2.62	96.39
490	******	1293	60848	2.09	98.48
500	*	246	61094	0.40	98.88
510	**	409	61503	0.66	99.54
520	*	202	61705	0.33	99.87
530		0	61705	0.00	99.87
540		0	61705	0.00	99.87
550		68	61773	0.11	99.98
560		0	61773	0.00	99.98
570		12	61785	0.02	100.00
580		0	61785	0.00	100.00
590		0	61785	0.00	100.00
600		0	61785	0.00	100.00
610		0	61785	0.00	100.00
620		0	61785	0.00	100.00
630		0	61785	0.00	100.00
640		0	61785	0.00	100.00
650		0	61785	0.00	100.00

1000 2000 3000 4000 5000 6000

Frequency

Figure B.8 Year 2006 Scale Score Distribution: Grade 4

Year 2008 Grade=4 Form=A



Scale Score Midpoint	Freq	Cum. Freq	Percent	Cum. Percent
240	4	4	0.01	0.01
250	0	4	0.00	0.01
260	11	15	0.04	0.05
270	7	22	0.02	0.07
280	1	23	0.00	0.08
290	11	34	0.04	0.11
300	19	53	0.06	0.18
310	34	87	0.11	0.29
320	137	224	0.46	0.74
330	154	378	0.51	1.26
340	504	882	1.67	2.93
350	511	1393	1.70	4.63
360	914	2307	3.04	7.66
370	1289	3596	4.28	11.95
380	1594	5190	5.30	17.24
390	2037	7227	6.77	24.01
400	2453	9680	8.15	32.16
410	2833	12513	9.41	41.57
420	2362	14875	7.85	49.42
430	2603	17478	8.65	58.06
440	2850	20328	9.47	67.53
450	2846	23174	9.45	76.99
460	1933	25107	6.42	83.41
470	951	26058	3.16	86.57
480	1666	27724	5.53	92.10
490	740	28464	2.46	94.56
500	543	29007	1.80	96.37
510	477	29484	1.58	97.95
520	324	29808	1.08	99.03
530	0	29808	0.00	99.03
540	179	29987	0.59	99.62
550	0	29987	0.00	99.62
560	84	30071	0.28	99.90
570	0	30071	0.00	99.90
580	30	30101	0.10	100.00
590	0	30101	0.00	100.00
600	0	30101	0.00	100.00
610	0	30101	0.00	100.00
620	0	30101	0.00	100.00
630	0	30101	0.00	100.00
640	0	30101	0.00	100.00
650	0	30101	0.00	100.00

Figure B.9 Year 2008 Scale Score Distribution: Grade 4 Form A

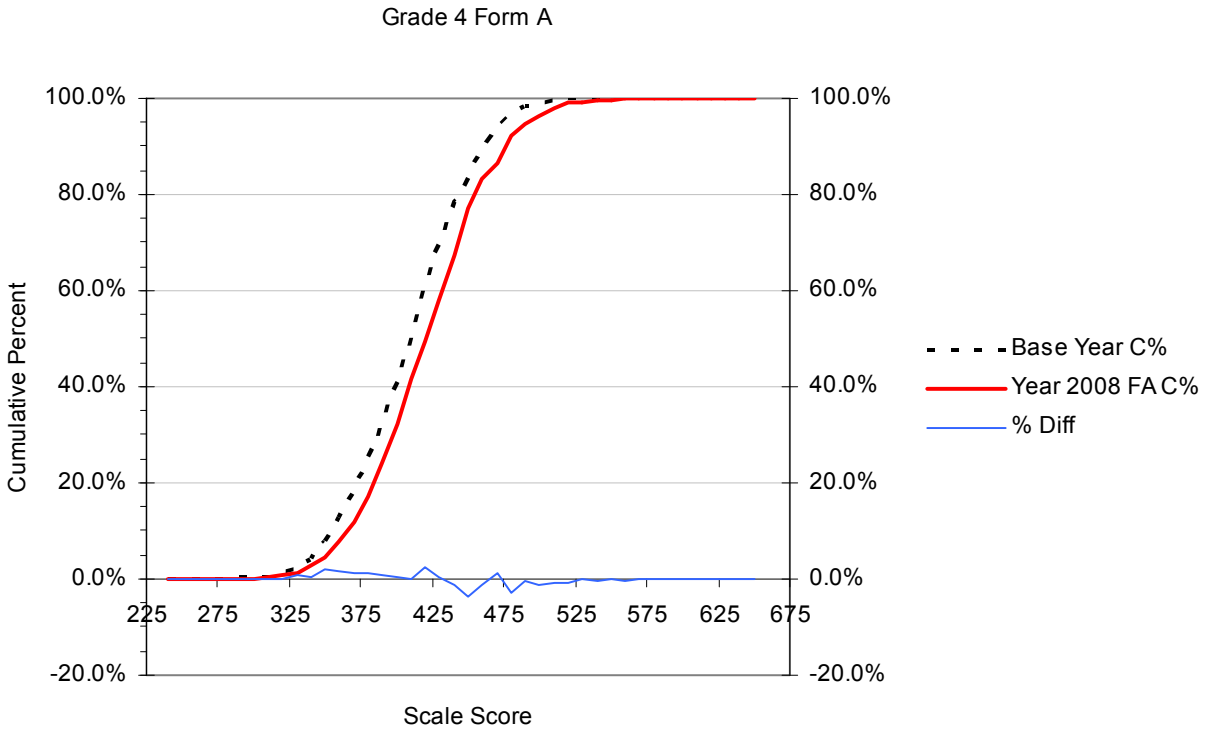


Figure B.10 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Percent Differences between CDFs: Grade 4 Form A

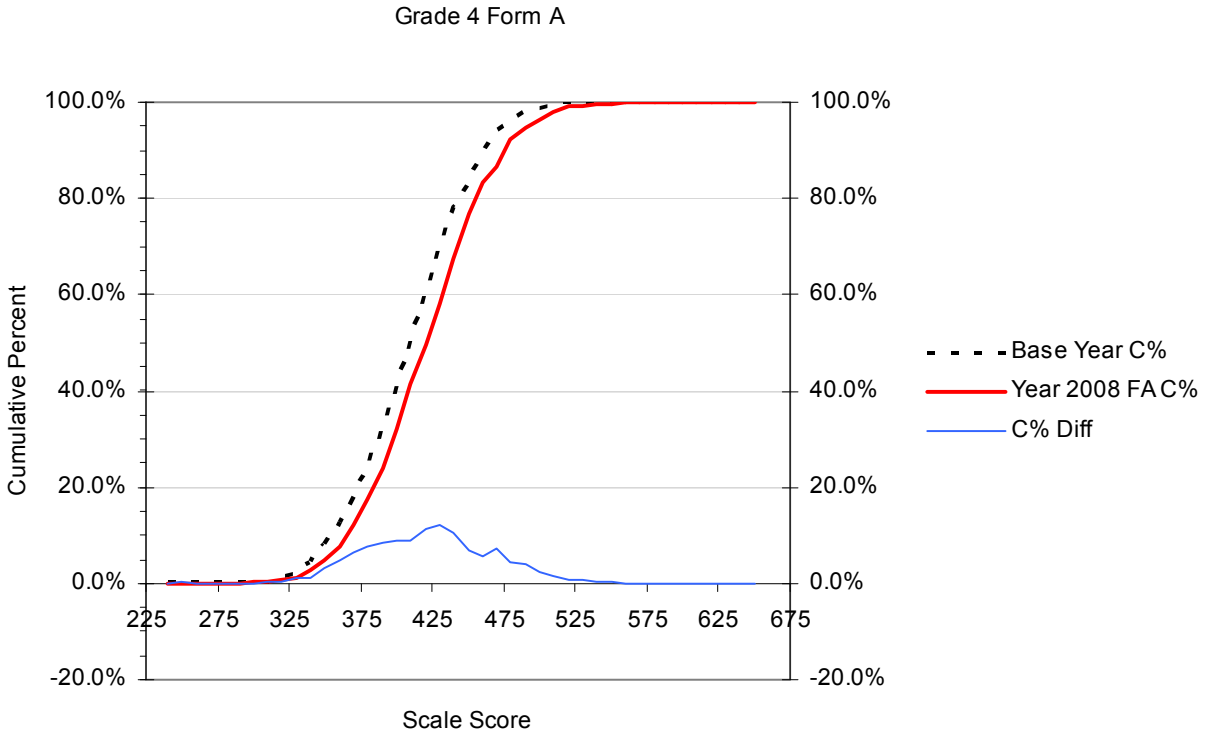
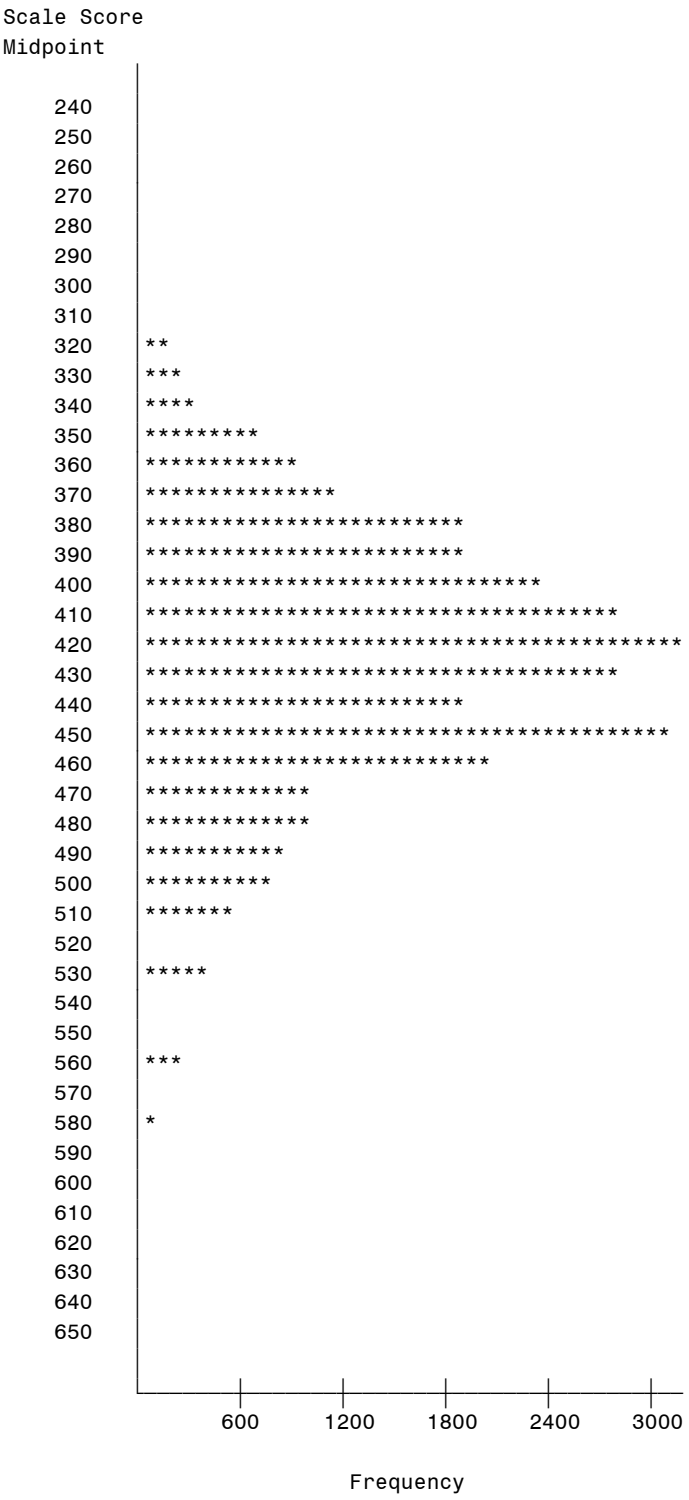


Figure B.11 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Cumulative Percent Differences between CDFs: Grade 4 Form A

Year 2008 Grade=4 Form=F



Scale Score Midpoint	Freq	Cum. Freq	Percent	Cum. Percent
240	7	7	0.02	0.02
250	0	7	0.00	0.02
260	7	14	0.02	0.05
270	5	19	0.02	0.06
280	2	21	0.01	0.07
290	4	25	0.01	0.08
300	14	39	0.05	0.13
310	28	67	0.09	0.22
320	125	192	0.42	0.64
330	223	415	0.74	1.39
340	328	743	1.10	2.48
350	651	1394	2.17	4.66
360	887	2281	2.96	7.62
370	1131	3412	3.78	11.40
380	1907	5319	6.37	17.77
390	1852	7171	6.19	23.96
400	2307	9478	7.71	31.66
410	2766	12244	9.24	40.90
420	3122	15366	10.43	51.33
430	2783	18149	9.30	60.63
440	1893	20042	6.32	66.96
450	3069	23111	10.25	77.21
460	2047	25158	6.84	84.05
470	990	26148	3.31	87.36
480	952	27100	3.18	90.54
490	860	27960	2.87	93.41
500	782	28742	2.61	96.02
510	559	29301	1.87	97.89
520	0	29301	0.00	97.89
530	397	29698	1.33	99.21
540	0	29698	0.00	99.21
550	0	29698	0.00	99.21
560	189	29887	0.63	99.85
570	0	29887	0.00	99.85
580	46	29933	0.15	100.00
590	0	29933	0.00	100.00
600	0	29933	0.00	100.00
610	0	29933	0.00	100.00
620	0	29933	0.00	100.00
630	0	29933	0.00	100.00
640	0	29933	0.00	100.00
650	0	29933	0.00	100.00

Figure B.12 Year 2008 Scale Score Distribution: Grade 4 Form F

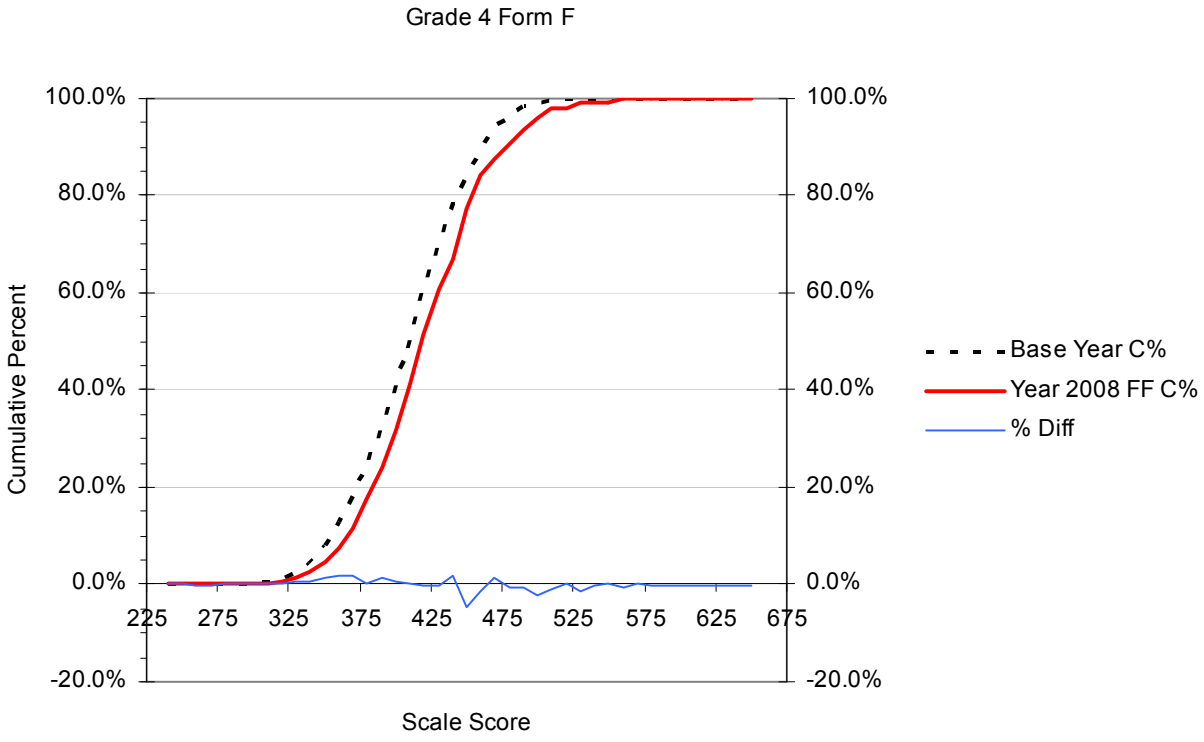


Figure B.13 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Percent Differences between CDFs: Grade 4 Form F

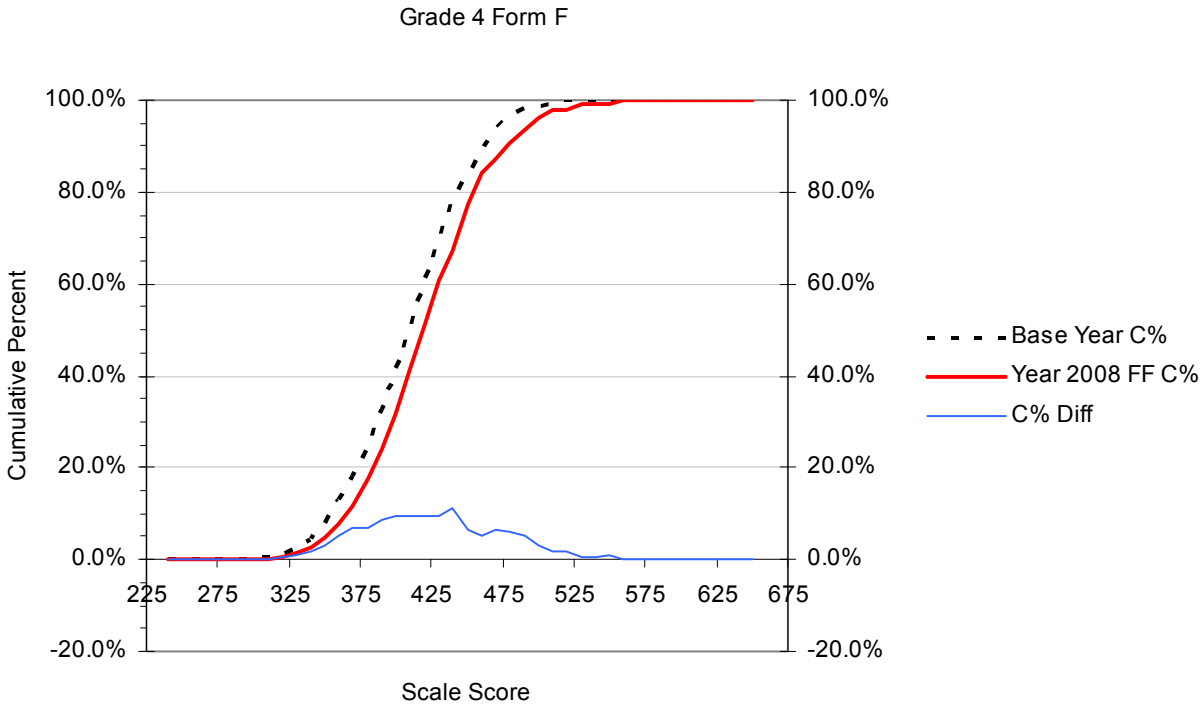


Figure B.14 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Cumulative Percent Differences between CDFs: Grade 4 Form F

Year 2006 Grade=5

Scale Score Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
240		78	78	0.12	0.12
250		3	81	0.00	0.13
260		2	83	0.00	0.13
270		2	85	0.00	0.13
280		4	89	0.01	0.14
290		2	91	0.00	0.14
300		19	110	0.03	0.17
310		38	148	0.06	0.23
320		94	242	0.15	0.38
330	**	339	581	0.53	0.92
340	****	720	1301	1.13	2.05
350	******	1168	2469	1.84	3.89
360	**********	2214	4683	3.49	7.38
370	**********	3926	8609	6.19	13.56
380	**********	3956	12565	6.23	19.80
390	**********	5734	18299	9.03	28.83
400	**********	5089	23388	8.02	36.85
410	**********	7170	30558	11.30	48.14
420	**********	6063	36621	9.55	57.70
430	**********	6337	42958	9.98	67.68
440	**********	4657	47615	7.34	75.02
450	**********	4491	52106	7.08	82.09
460	**********	3410	55516	5.37	87.46
470	**********	3366	58882	5.30	92.77
480	*******	1493	60375	2.35	95.12
490	*********	1749	62124	2.76	97.87
500	***	595	62719	0.94	98.81
510	**	404	63123	0.64	99.45
520	*	229	63352	0.36	99.81
530		0	63352	0.00	99.81
540		96	63448	0.15	99.96
550		0	63448	0.00	99.96
560		20	63468	0.03	99.99
570		0	63468	0.00	99.99
580		0	63468	0.00	99.99
590		5	63473	0.01	100.00
600		0	63473	0.00	100.00
610		0	63473	0.00	100.00
620		0	63473	0.00	100.00
630		0	63473	0.00	100.00
640		0	63473	0.00	100.00
650		0	63473	0.00	100.00

1000 2000 3000 4000 5000 6000 7000

Frequency

Figure B.15 Year 2006 Scale Score Distribution: Grade 5

Year 2008 Grade=5 Form=A

Scale Score Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
240		1	1	0.00	0.00
250		3	4	0.01	0.01
260		0	4	0.00	0.01
270		8	12	0.03	0.04
280		13	25	0.04	0.08
290		13	38	0.04	0.12
300		9	47	0.03	0.15
310		14	61	0.05	0.20
320		36	97	0.12	0.32
330	*	57	154	0.19	0.50
340	***	208	362	0.68	1.19
350	*****	380	742	1.24	2.43
360	**********	803	1545	2.63	5.06
370	**********	1131	2676	3.70	8.76
380	**********	1926	4602	6.31	15.07
390	**********	1931	6533	6.32	21.39
400	**********	2830	9363	9.27	30.66
410	**********	2540	11903	8.32	38.98
420	**********	3450	15353	11.30	50.28
430	**********	2943	18296	9.64	59.91
440	**********	3162	21458	10.35	70.27
450	**********	2315	23773	7.58	77.85
460	**********	2211	25984	7.24	85.09
470	**********	1399	27383	4.58	89.67
480	**********	1272	28655	4.17	93.84
490	**********	967	29622	3.17	97.00
500	*****	354	29976	1.16	98.16
510	***	255	30231	0.84	99.00
520	**	169	30400	0.55	99.55
530		0	30400	0.00	99.55
540	*	93	30493	0.30	99.86
550		0	30493	0.00	99.86
560		33	30526	0.11	99.96
570		0	30526	0.00	99.96
580		0	30526	0.00	99.96
590		11	30537	0.04	100.00
600		0	30537	0.00	100.00
610		0	30537	0.00	100.00
620		0	30537	0.00	100.00
630		0	30537	0.00	100.00
640		0	30537	0.00	100.00
650		0	30537	0.00	100.00

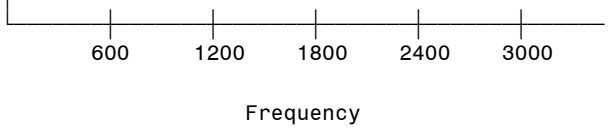


Figure B.16 Year 2008 Scale Score Distribution: Grade 5 Form A

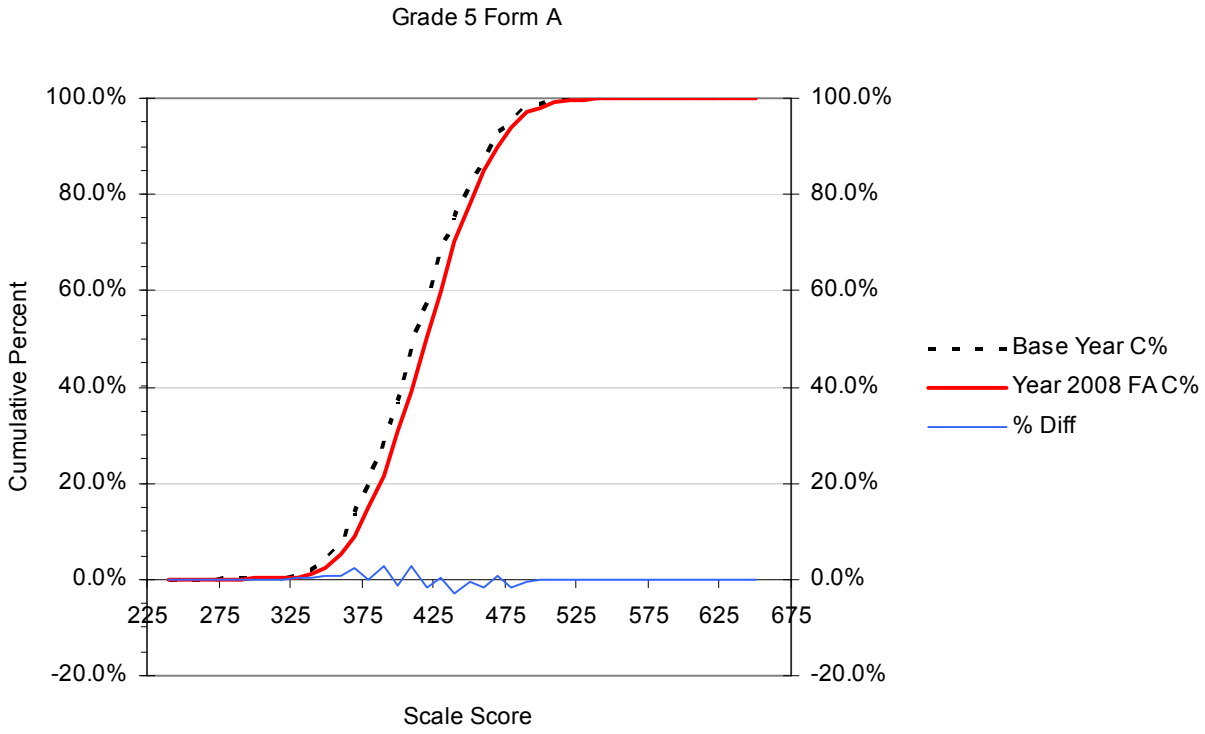


Figure B.17 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Percent Differences between CDFs: Grade 5 Form A

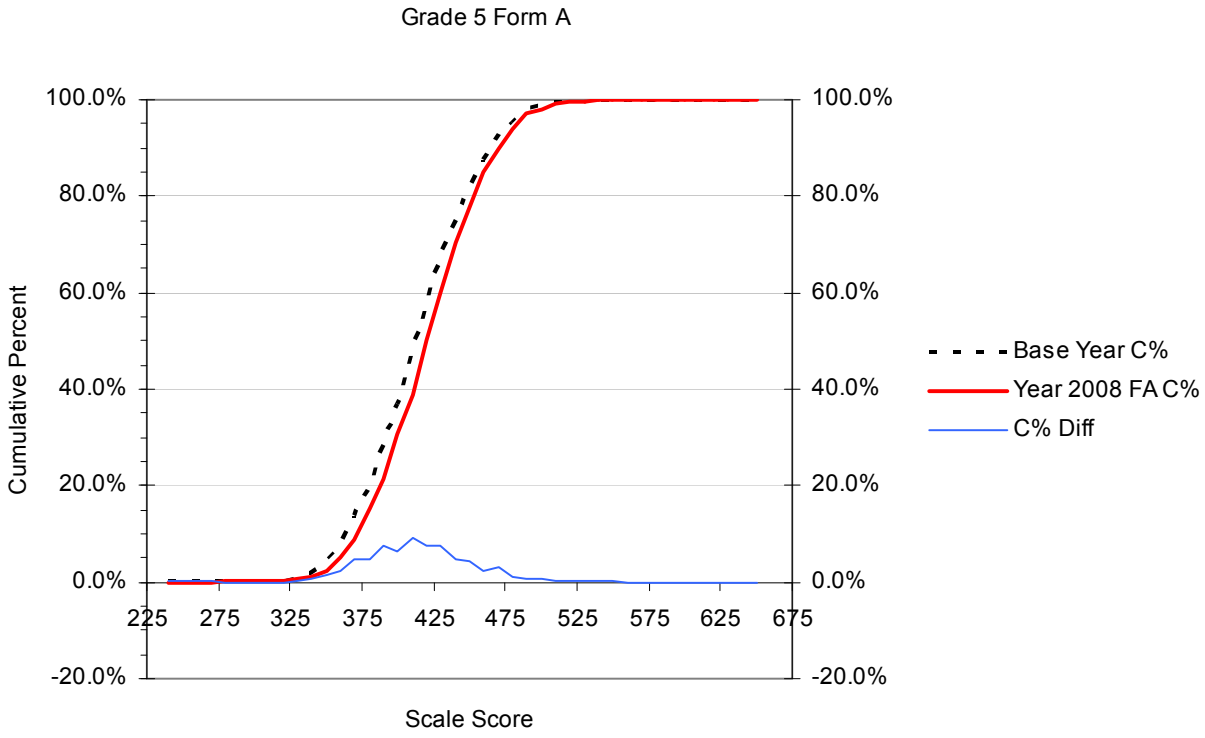


Figure B.18 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Cumulative Percent Differences between CDFs: Grade 5 Form A

Year 2008 Grade=5 Form=F

Scale Score Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
240		8	8	0.03	0.03
250		0	8	0.00	0.03
260		0	8	0.00	0.03
270		0	8	0.00	0.03
280		3	11	0.01	0.04
290		4	15	0.01	0.05
300		5	20	0.02	0.07
310		11	31	0.04	0.10
320		26	57	0.09	0.19
330	*	64	121	0.21	0.40
340	***	193	314	0.64	1.04
350	*****	402	716	1.33	2.36
360	**********	752	1468	2.48	4.85
370	***************	1148	2616	3.79	8.64
380	********************	1497	4113	4.94	13.58
390	********************************	2367	6480	7.81	21.39
400	******************************	2252	8732	7.44	28.83
410	**	3057	11789	10.09	38.92
420	**********************************	2705	14494	8.93	47.85
430	**********************************	2772	17266	9.15	57.00
440	**	2926	20192	9.66	66.66
450	******************************	2257	22449	7.45	74.12
460	******************************	2235	24684	7.38	81.49
470	*******************************	2206	26890	7.28	88.78
480	******************	1340	28230	4.42	93.20
490	********	583	28813	1.92	95.13
500	*******	498	29311	1.64	96.77
510	*********	691	30002	2.28	99.05
520		0	30002	0.00	99.05
530	**	165	30167	0.54	99.60
540	*	92	30259	0.30	99.90
550		0	30259	0.00	99.90
560		0	30259	0.00	99.90
570		25	30284	0.08	99.98
580		0	30284	0.00	99.98
590		5	30289	0.02	100.00
600		0	30289	0.00	100.00
610		0	30289	0.00	100.00
620		0	30289	0.00	100.00
630		0	30289	0.00	100.00
640		0	30289	0.00	100.00
650		0	30289	0.00	100.00

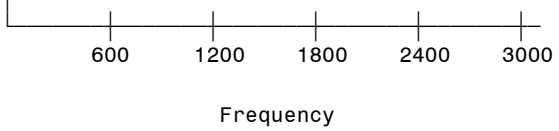


Figure B.19 Year 2008 Scale Score Distribution: Grade 5 Form F

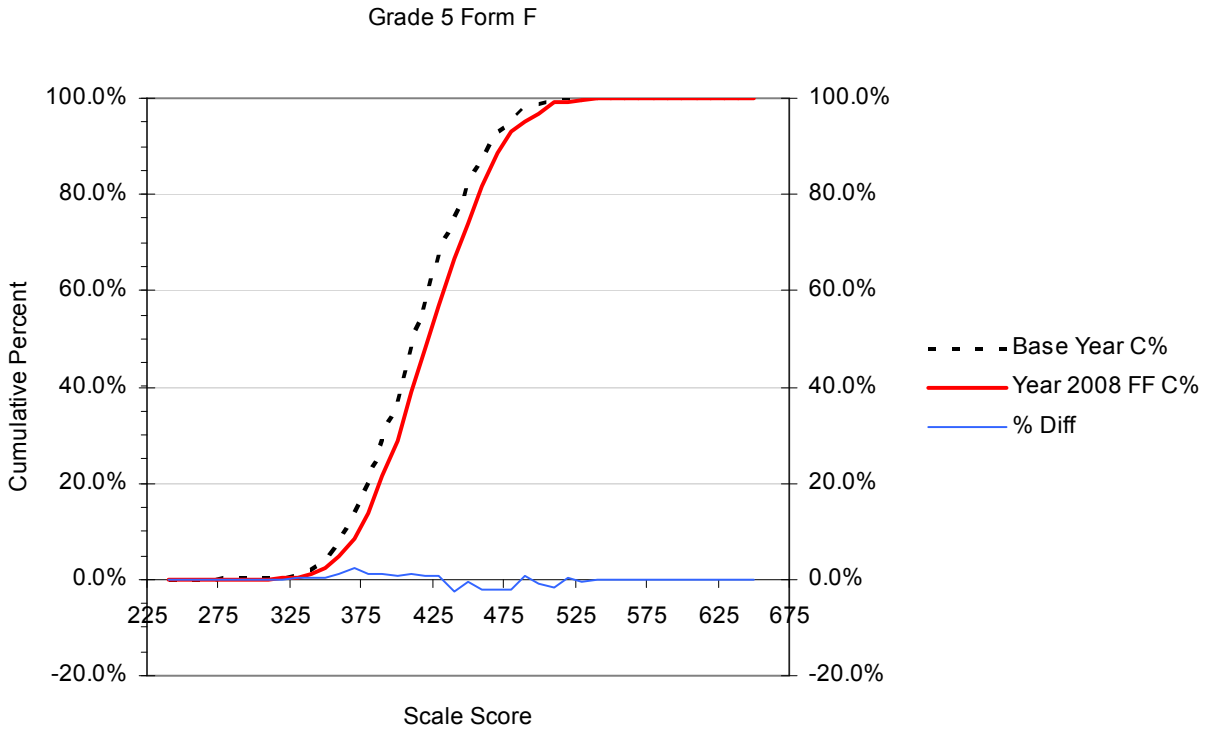


Figure B.20 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Percent Differences between CDFs: Grade 5 Form F

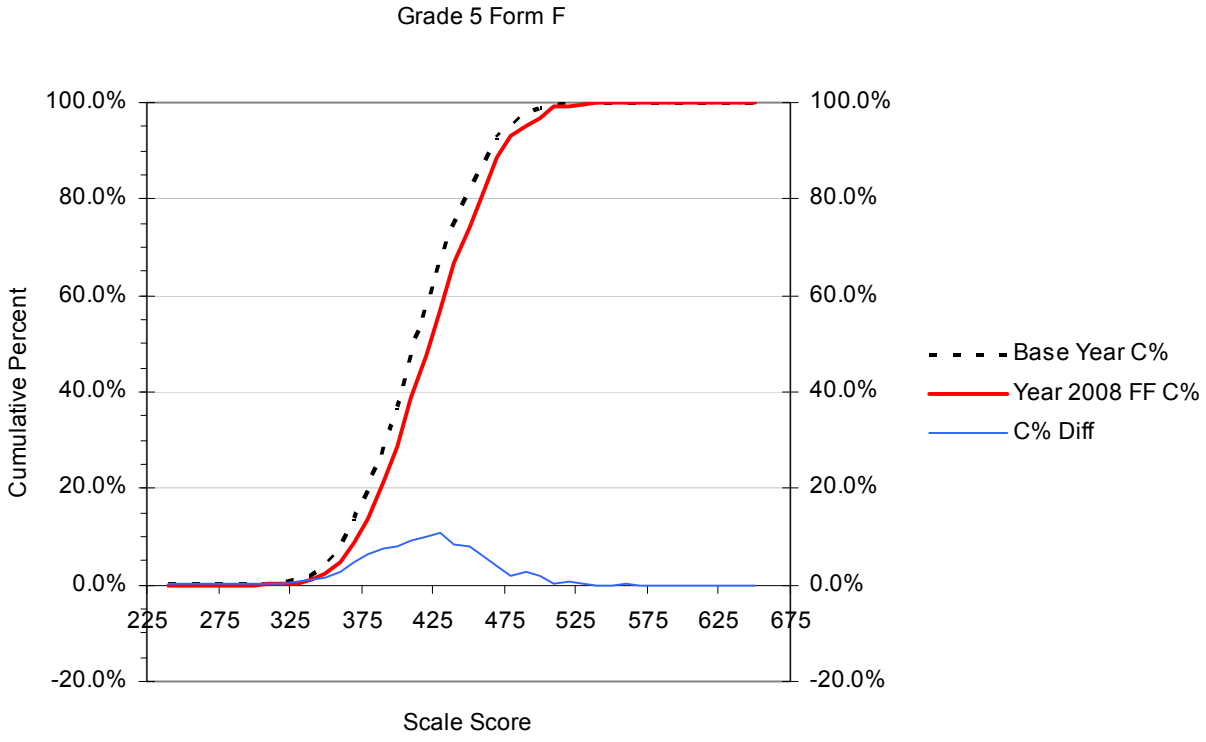
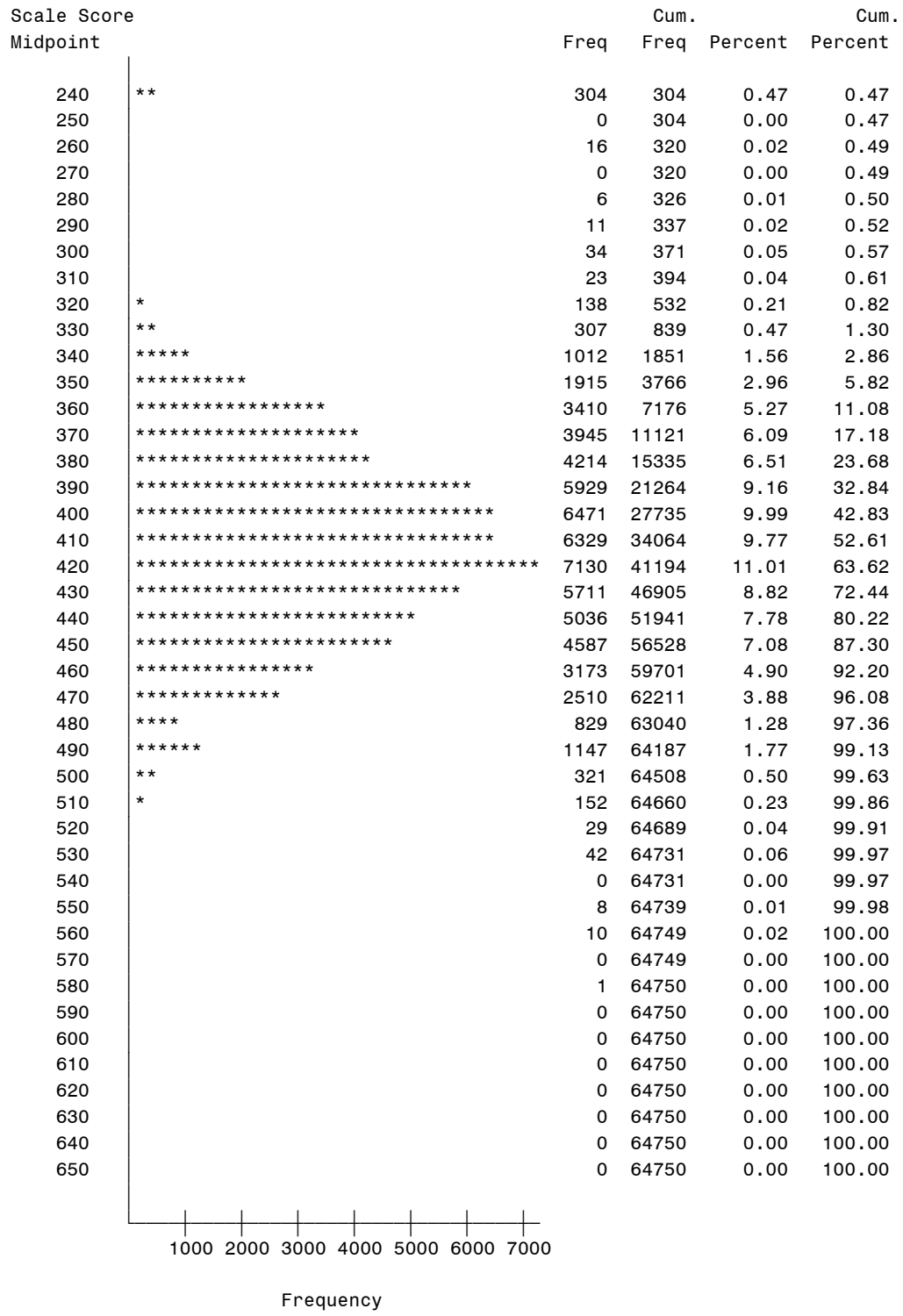


Figure B.21 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Cumulative Percent Differences between CDFs: Grade 5 Form F

Year 2006 Grade=6



Scale Score Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
240	**	304	304	0.47	0.47
250		0	304	0.00	0.47
260		16	320	0.02	0.49
270		0	320	0.00	0.49
280		6	326	0.01	0.50
290		11	337	0.02	0.52
300		34	371	0.05	0.57
310		23	394	0.04	0.61
320	*	138	532	0.21	0.82
330	**	307	839	0.47	1.30
340	*****	1012	1851	1.56	2.86
350	**********	1915	3766	2.96	5.82
360	**********	3410	7176	5.27	11.08
370	**********	3945	11121	6.09	17.18
380	**********	4214	15335	6.51	23.68
390	**********	5929	21264	9.16	32.84
400	**********	6471	27735	9.99	42.83
410	**********	6329	34064	9.77	52.61
420	**********	7130	41194	11.01	63.62
430	**********	5711	46905	8.82	72.44
440	**********	5036	51941	7.78	80.22
450	**********	4587	56528	7.08	87.30
460	**********	3173	59701	4.90	92.20
470	**********	2510	62211	3.88	96.08
480	****	829	63040	1.28	97.36
490	******	1147	64187	1.77	99.13
500	**	321	64508	0.50	99.63
510	*	152	64660	0.23	99.86
520		29	64689	0.04	99.91
530		42	64731	0.06	99.97
540		0	64731	0.00	99.97
550		8	64739	0.01	99.98
560		10	64749	0.02	100.00
570		0	64749	0.00	100.00
580		1	64750	0.00	100.00
590		0	64750	0.00	100.00
600		0	64750	0.00	100.00
610		0	64750	0.00	100.00
620		0	64750	0.00	100.00
630		0	64750	0.00	100.00
640		0	64750	0.00	100.00
650		0	64750	0.00	100.00

Figure B.22 Year 2006 Scale Score Distribution: Grade 6

Year 2008 Grade=6 Form=A

Scale Score Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
240		1	1	0.00	0.00
250		0	1	0.00	0.00
260		4	5	0.01	0.02
270		0	5	0.00	0.02
280		5	10	0.02	0.03
290		0	10	0.00	0.03
300		2	12	0.01	0.04
310		17	29	0.05	0.09
320		16	45	0.05	0.14
330	*	48	93	0.15	0.30
340	**	176	269	0.57	0.87
350	******	454	723	1.46	2.33
360	**********	1028	1751	3.31	5.64
370	**********	1463	3214	4.71	10.35
380	**********	1724	4938	5.55	15.90
390	**********	2522	7460	8.12	24.02
400	**********	2733	10193	8.80	32.82
410	**********	2947	13140	9.49	42.31
420	**********	2995	16135	9.64	51.95
430	**********	2516	18651	8.10	60.05
440	**********	2669	21320	8.59	68.64
450	**********	2262	23582	7.28	75.92
460	**********	2237	25819	7.20	83.13
470	**********	1609	27428	5.18	88.31
480	**********	1458	28886	4.69	93.00
490	*********	685	29571	2.21	95.21
500	********	570	30141	1.84	97.04
510	******	466	30607	1.50	98.54
520	****	312	30919	1.00	99.55
530		0	30919	0.00	99.55
540	*	110	31029	0.35	99.90
550		0	31029	0.00	99.90
560		31	31060	0.10	100.00
570		0	31060	0.00	100.00
580		0	31060	0.00	100.00
590		0	31060	0.00	100.00
600		0	31060	0.00	100.00
610		0	31060	0.00	100.00
620		0	31060	0.00	100.00
630		0	31060	0.00	100.00
640		0	31060	0.00	100.00
650		0	31060	0.00	100.00

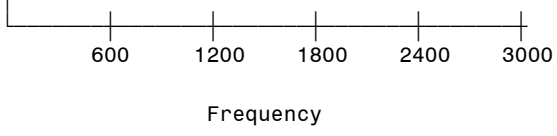


Figure B.23 Year 2008 Scale Score Distribution: Grade 6 Form A

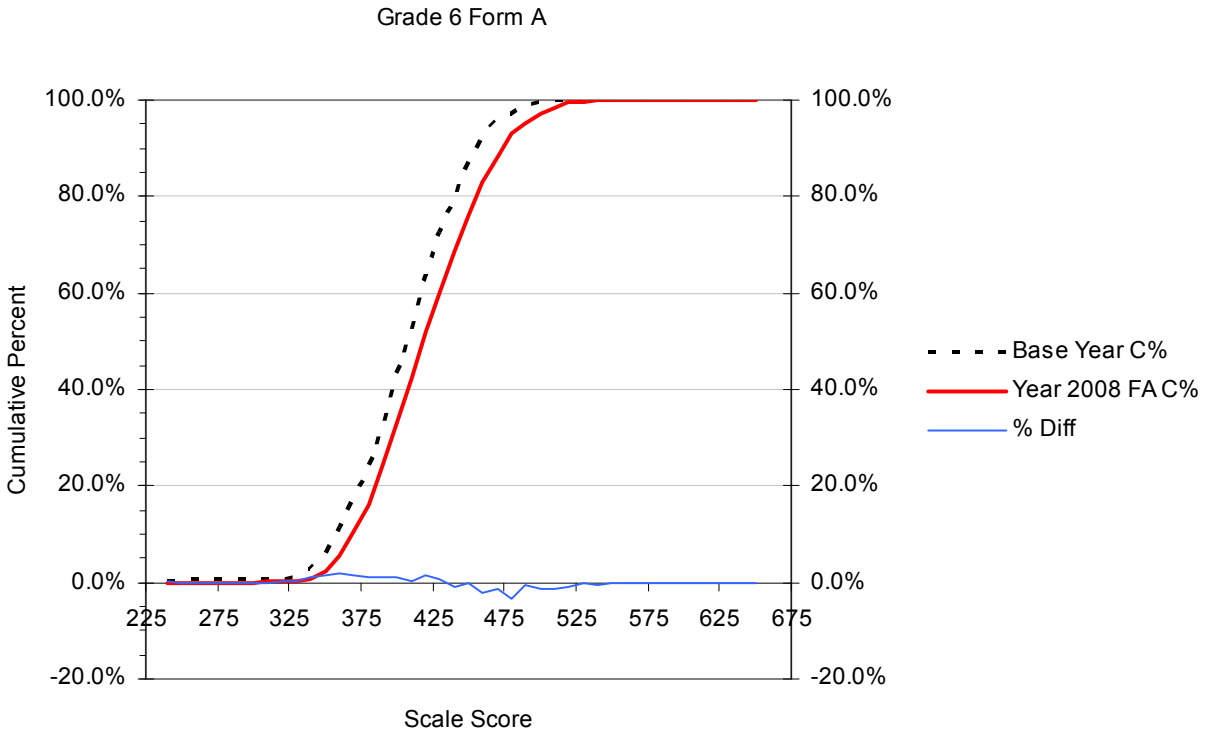


Figure C.24 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Percent Differences between CDFs: Grade 6 Form A

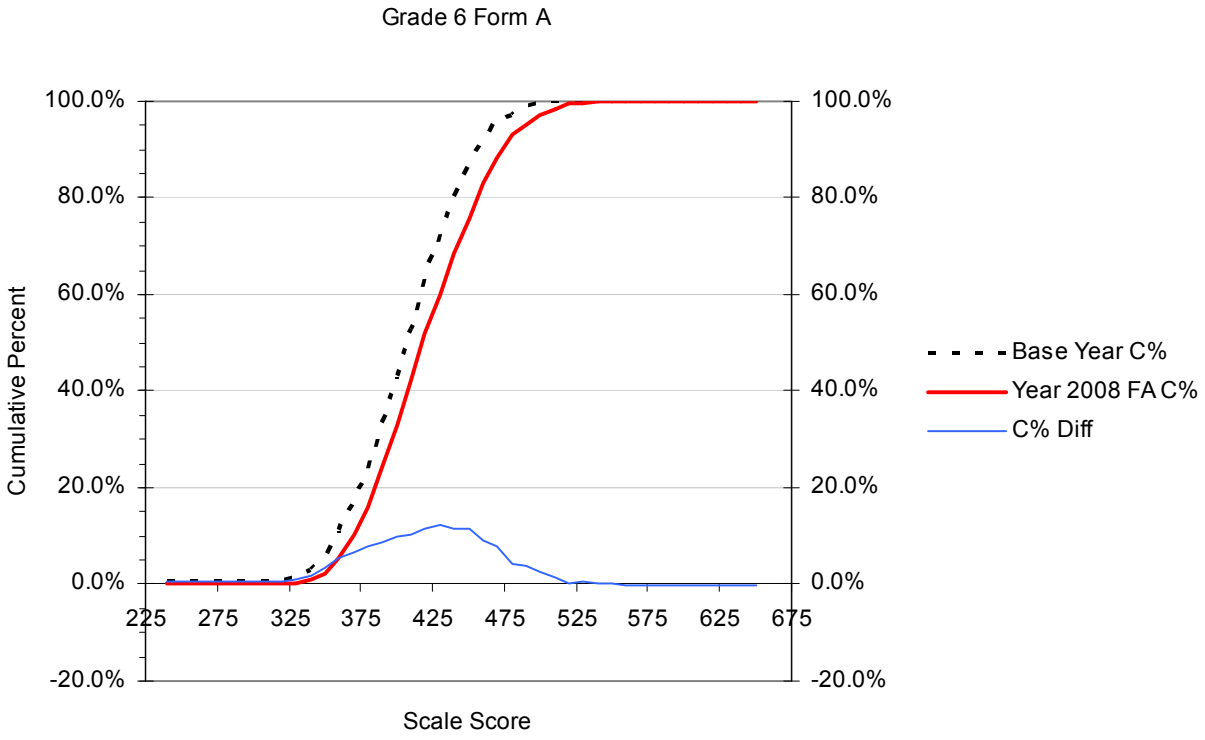
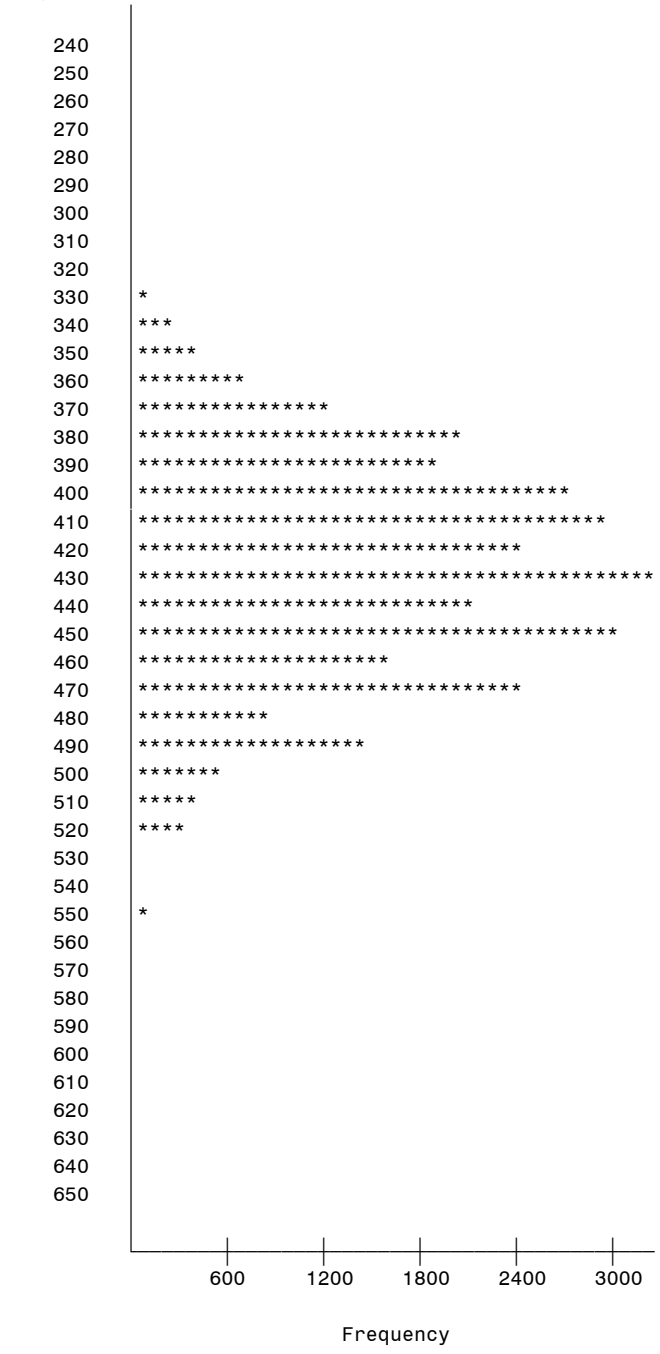


Figure B.25 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Cumulative Percent Differences between CDFs: Grade 6 Form A

Year 2008 Grade=6 Form=F



Scale Score Midpoint	Freq	Cum. Freq	Percent	Cum. Percent
240	2	2	0.01	0.01
250	0	2	0.00	0.01
260	2	4	0.01	0.01
270	0	4	0.00	0.01
280	2	6	0.01	0.02
290	1	7	0.00	0.02
300	6	13	0.02	0.04
310	7	20	0.02	0.07
320	25	45	0.08	0.15
330	57	102	0.19	0.34
340	207	309	0.68	1.02
350	401	710	1.32	2.34
360	642	1352	2.12	4.46
370	1189	2541	3.93	8.39
380	2043	4584	6.74	15.13
390	1850	6434	6.11	21.24
400	2684	9118	8.86	30.10
410	2907	12025	9.60	39.70
420	2400	14425	7.92	47.62
430	3244	17669	10.71	58.33
440	2101	19770	6.94	65.26
450	3004	22774	9.92	75.18
460	1605	24379	5.30	80.48
470	2370	26749	7.82	88.30
480	812	27561	2.68	90.98
490	1392	28953	4.60	95.58
500	526	29479	1.74	97.32
510	407	29886	1.34	98.66
520	268	30154	0.88	99.54
530	0	30154	0.00	99.54
540	0	30154	0.00	99.54
550	109	30263	0.36	99.90
560	0	30263	0.00	99.90
570	29	30292	0.10	100.00
580	0	30292	0.00	100.00
590	0	30292	0.00	100.00
600	0	30292	0.00	100.00
610	0	30292	0.00	100.00
620	0	30292	0.00	100.00
630	0	30292	0.00	100.00
640	0	30292	0.00	100.00
650	0	30292	0.00	100.00

Figure B.26 Year 2008 Scale Score Distribution: Grade 6 Form F

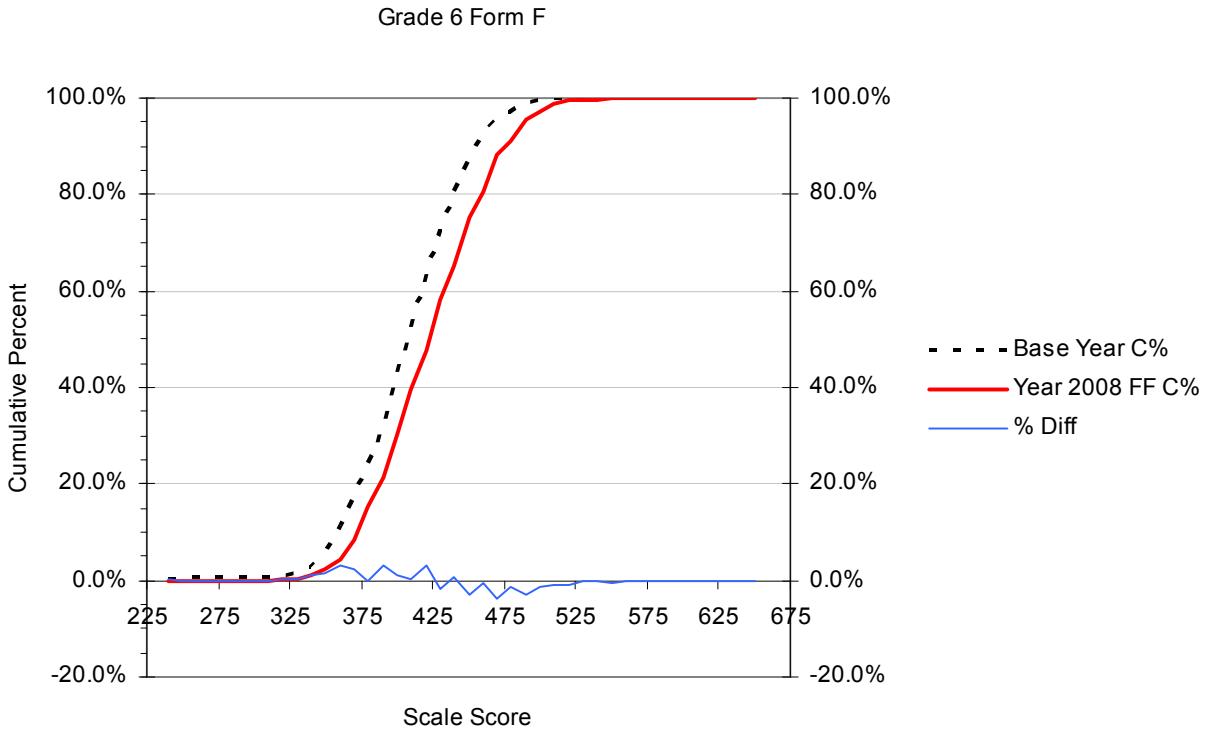


Figure C.27 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Percent Differences between CDFs: Grade 6 Form F

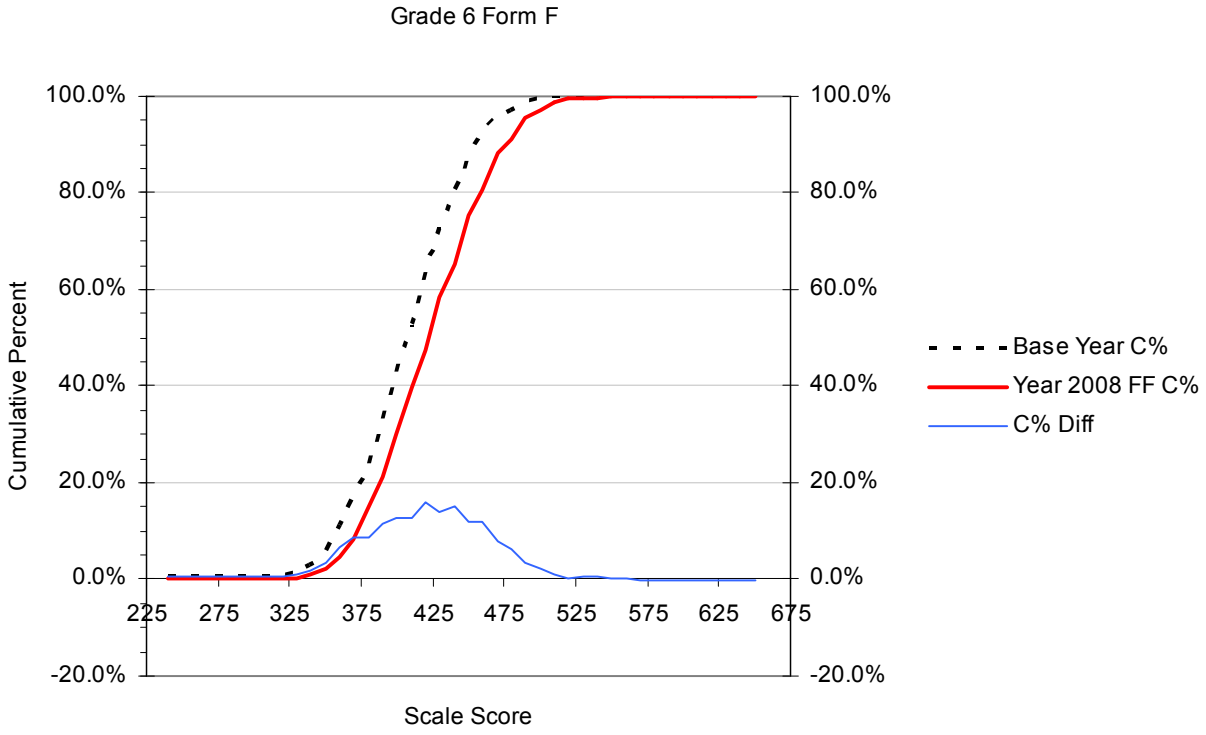


Figure B.28 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Cumulative Percent Differences between CDFs: Grade 6 Form F

Year 2006 Grade=7

Scale Score Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
240		0	0	0.00	0.00
250	*	259	259	0.39	0.39
260	*	185	444	0.28	0.67
270		23	467	0.03	0.71
280		12	479	0.02	0.73
290		28	507	0.04	0.77
300		25	532	0.04	0.81
310		61	593	0.09	0.90
320	*	246	839	0.37	1.27
330	**	409	1248	0.62	1.90
340	*******	1306	2554	1.98	3.88
350	**********	2765	5319	4.20	8.08
360	**********	3979	9298	6.04	14.12
370	**********	5116	14414	7.77	21.90
380	**********	5818	20232	8.84	30.73
390	**********	5891	26123	8.95	39.68
400	**********	5703	31826	8.66	48.35
410	**********	5760	37586	8.75	57.10
420	**********	5606	43192	8.52	65.61
430	**********	4488	47680	6.82	72.43
440	**********	4852	52532	7.37	79.80
450	**********	3994	56526	6.07	85.87
460	**********	3202	59728	4.86	90.73
470	**********	2372	62100	3.60	94.34
480	********	1665	63765	2.53	96.86
490	*****	1008	64773	1.53	98.40
500	**	436	65209	0.66	99.06
510	**	327	65536	0.50	99.55
520	*	174	65710	0.26	99.82
530		82	65792	0.12	99.94
540		0	65792	0.00	99.94
550		21	65813	0.03	99.98
560		10	65823	0.02	99.99
570		5	65828	0.01	100.00
580		1	65829	0.00	100.00
590		0	65829	0.00	100.00
600		0	65829	0.00	100.00
610		0	65829	0.00	100.00
620		0	65829	0.00	100.00
630		0	65829	0.00	100.00
640		0	65829	0.00	100.00
650		0	65829	0.00	100.00

1000 2000 3000 4000 5000

Frequency

Figure B.29 Year 2006 Scale Score Distribution: Grade 7

Year 2008 Grade=7 Form=A

Scale Score Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
240		4	4	0.01	0.01
250		0	4	0.00	0.01
260		0	4	0.00	0.01
270		8	12	0.03	0.04
280		0	12	0.00	0.04
290		15	27	0.05	0.08
300		14	41	0.04	0.13
310		36	77	0.11	0.24
320	*	66	143	0.21	0.45
330	***	210	353	0.66	1.11
340	******	417	770	1.31	2.42
350	**********	1006	1776	3.16	5.58
360	**********	1278	3054	4.02	9.60
370	**********	1896	4950	5.96	15.56
380	**********	2651	7601	8.34	23.90
390	**********	2293	9894	7.21	31.11
400	**********	2960	12854	9.31	40.42
410	**********	3087	15941	9.71	50.12
420	**********	3145	19086	9.89	60.01
430	**********	2432	21518	7.65	67.66
440	**********	2301	23819	7.23	74.89
450	**********	2264	26083	7.12	82.01
460	**********	1625	27708	5.11	87.12
470	**********	1597	29305	5.02	92.14
480	**********	911	30216	2.86	95.01
490	**********	738	30954	2.32	97.33
500	****	314	31268	0.99	98.31
510	***	210	31478	0.66	98.97
520	**	155	31633	0.49	99.46
530	*	109	31742	0.34	99.81
540		0	31742	0.00	99.81
550	*	45	31787	0.14	99.95
560		0	31787	0.00	99.95
570		0	31787	0.00	99.95
580		14	31801	0.04	99.99
590		0	31801	0.00	99.99
600		3	31804	0.01	100.00
610		0	31804	0.00	100.00
620		0	31804	0.00	100.00
630		0	31804	0.00	100.00
640		0	31804	0.00	100.00
650		0	31804	0.00	100.00

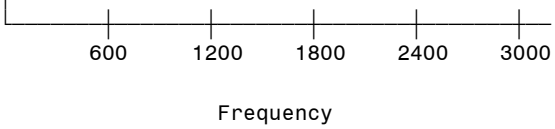


Figure B.30 Year 2008 Scale Score Distribution: Grade 7 Form A

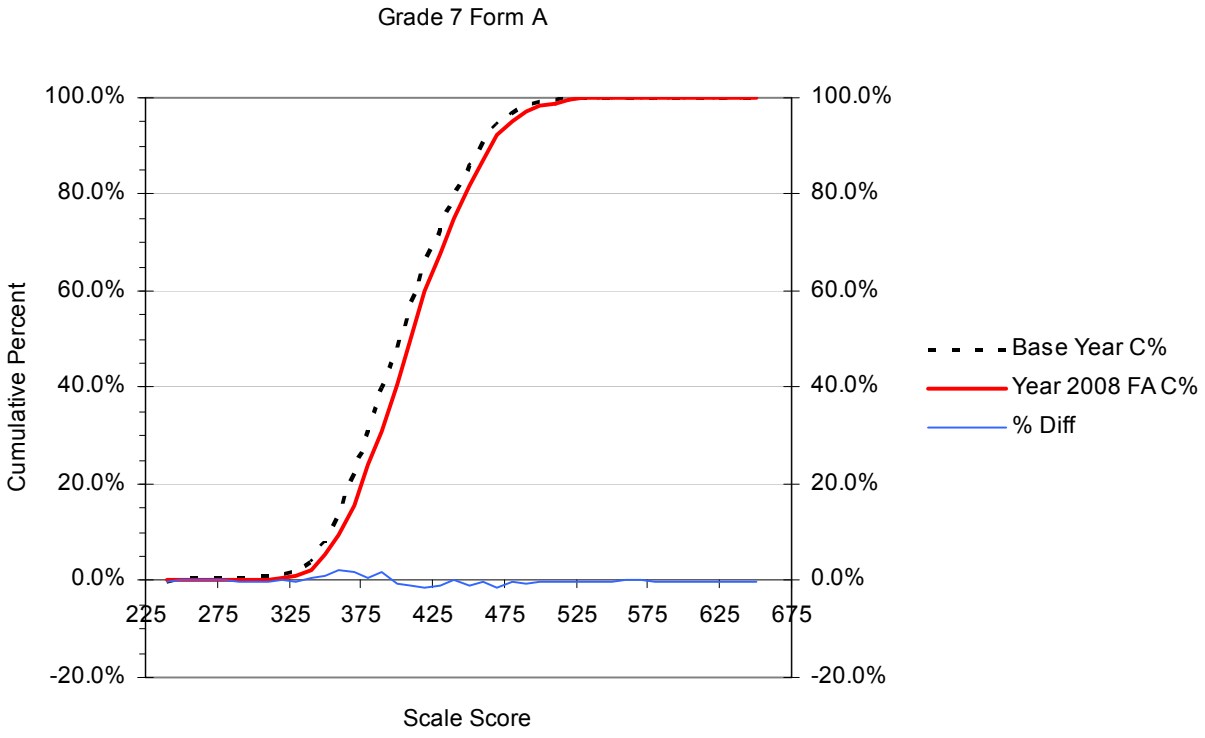


Figure B.31 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Percent Differences between CDFs: Grade 7 Form A

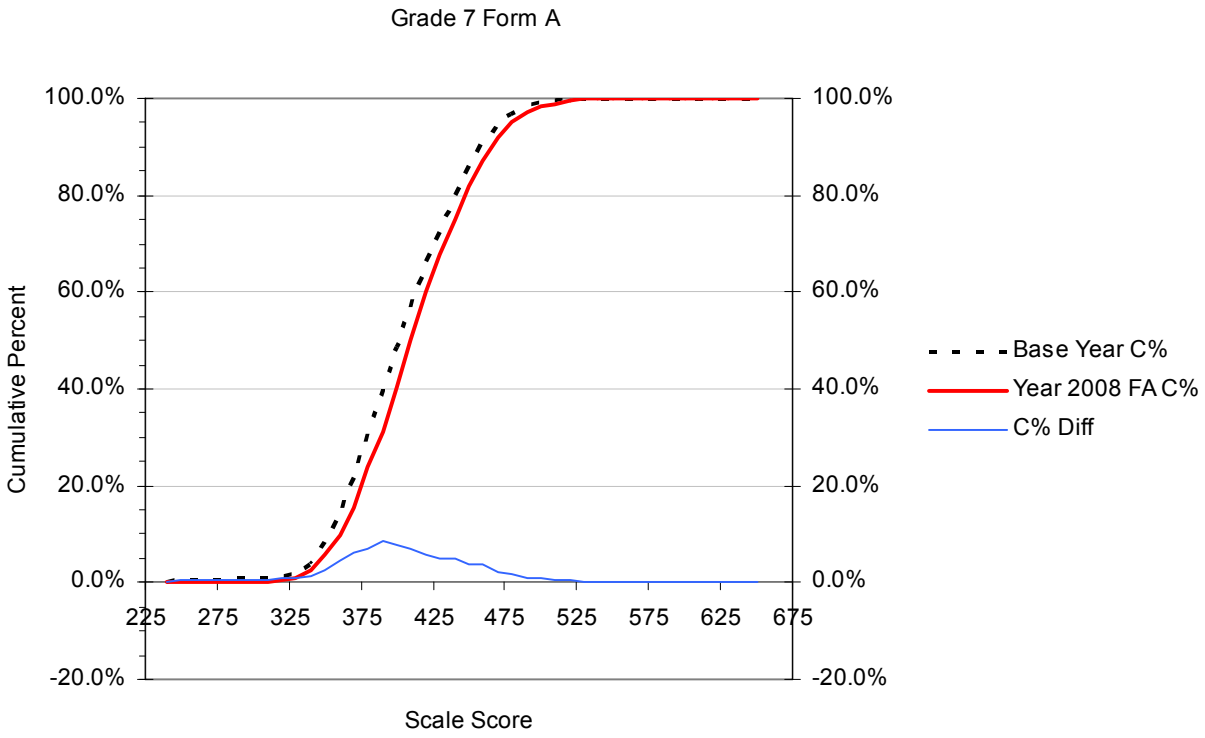
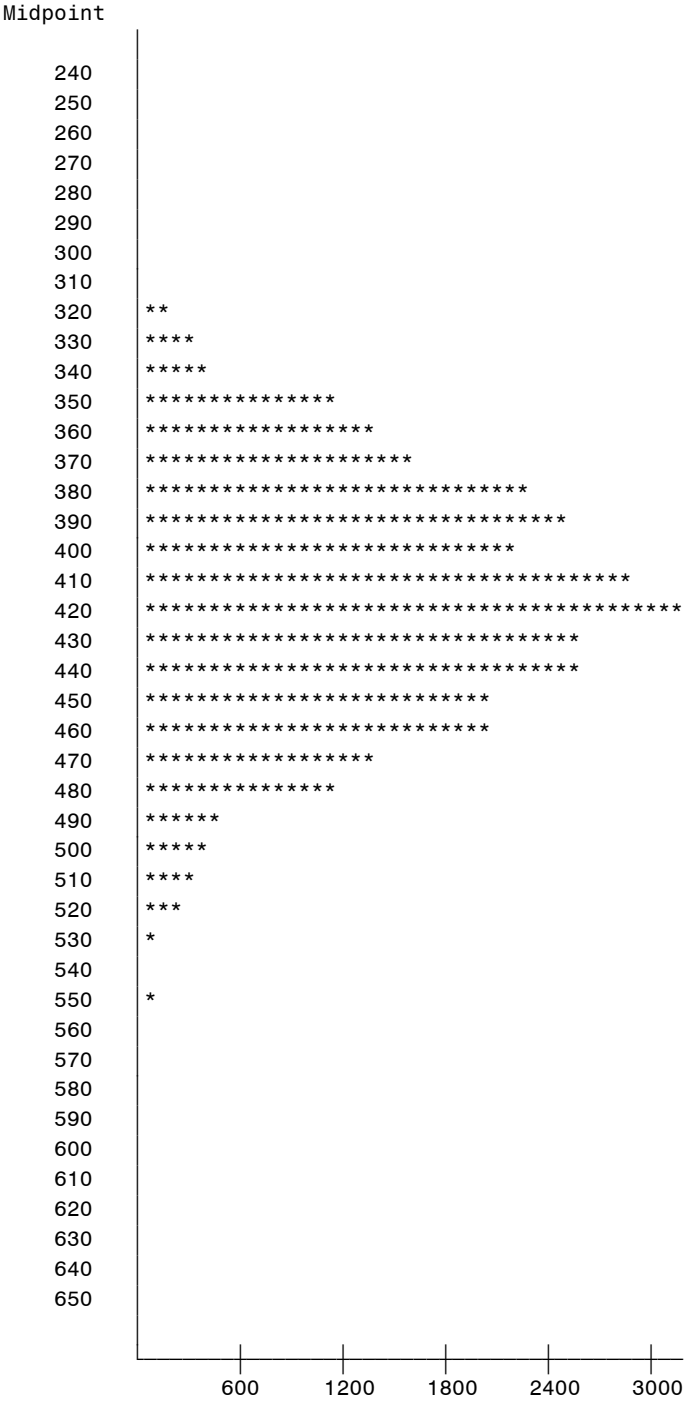


Figure B.32 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Cumulative Percent Differences between CDFs: Grade 7 Form A

Year 2008 Grade=7 Form=F



Scale Score Midpoint	Freq	Cum. Freq	Percent	Cum. Percent
240	0	0	0.00	0.00
250	10	10	0.03	0.03
260	0	10	0.00	0.03
270	4	14	0.01	0.05
280	0	14	0.00	0.05
290	8	22	0.03	0.07
300	15	37	0.05	0.12
310	18	55	0.06	0.18
320	115	170	0.37	0.55
330	276	446	0.89	1.44
340	410	856	1.32	2.76
350	1147	2003	3.69	6.45
360	1367	3370	4.40	10.85
370	1560	4930	5.02	15.88
380	2213	7143	7.13	23.01
390	2512	9655	8.09	31.10
400	2181	11836	7.02	38.12
410	2860	14696	9.21	47.33
420	3132	17828	10.09	57.42
430	2565	20393	8.26	65.68
440	2553	22946	8.22	73.90
450	2021	24967	6.51	80.41
460	2039	27006	6.57	86.98
470	1360	28366	4.38	91.36
480	1156	29522	3.72	95.09
490	484	30006	1.56	96.64
500	372	30378	1.20	97.84
510	309	30687	1.00	98.84
520	197	30884	0.63	99.47
530	110	30994	0.35	99.83
540	0	30994	0.00	99.83
550	46	31040	0.15	99.97
560	0	31040	0.00	99.97
570	0	31040	0.00	99.97
580	8	31048	0.03	100.00
590	0	31048	0.00	100.00
600	0	31048	0.00	100.00
610	0	31048	0.00	100.00
620	0	31048	0.00	100.00
630	0	31048	0.00	100.00
640	0	31048	0.00	100.00
650	0	31048	0.00	100.00

Figure B.33 Year 2008 Scale Score Distribution: Grade 7 Form F

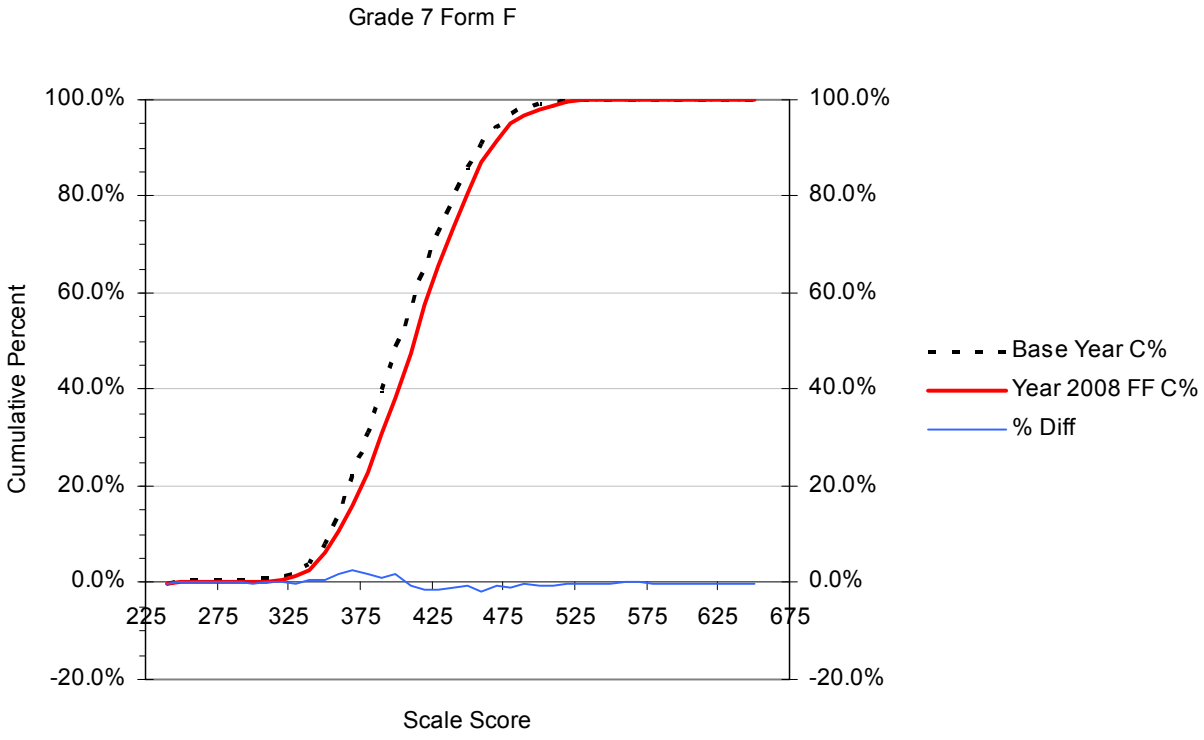


Figure B.34 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Percent Differences between CDFs: Grade 7 Form F

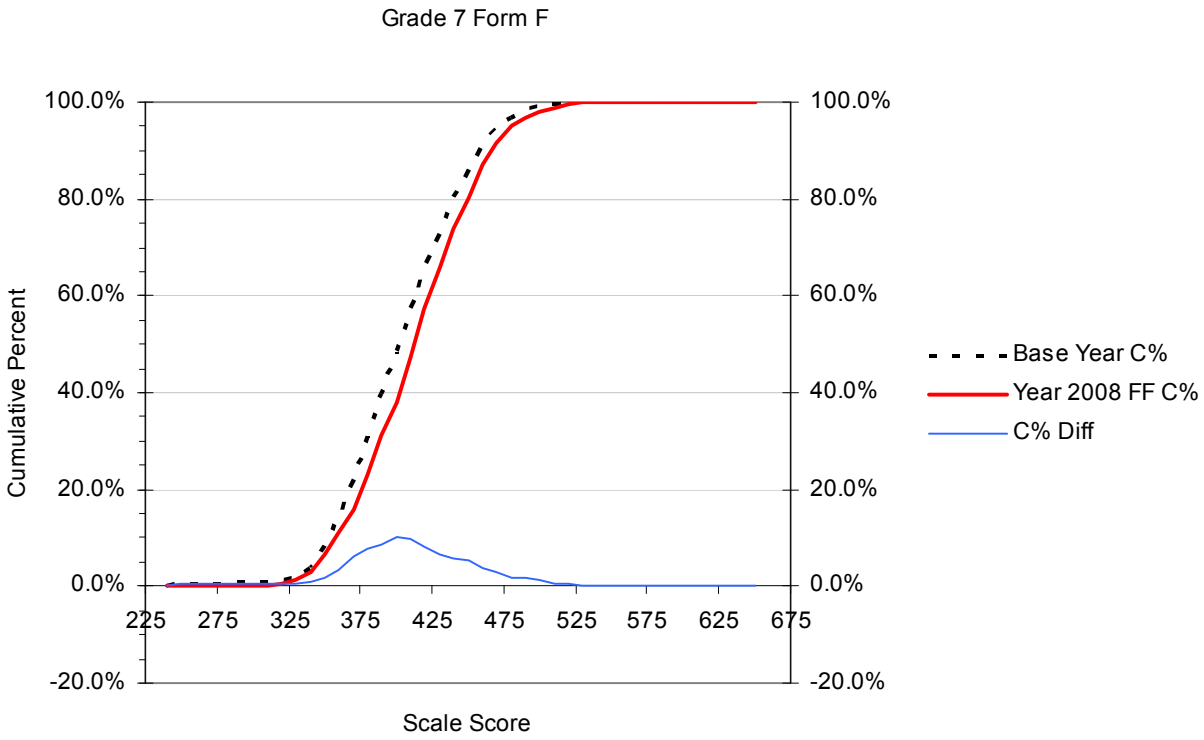
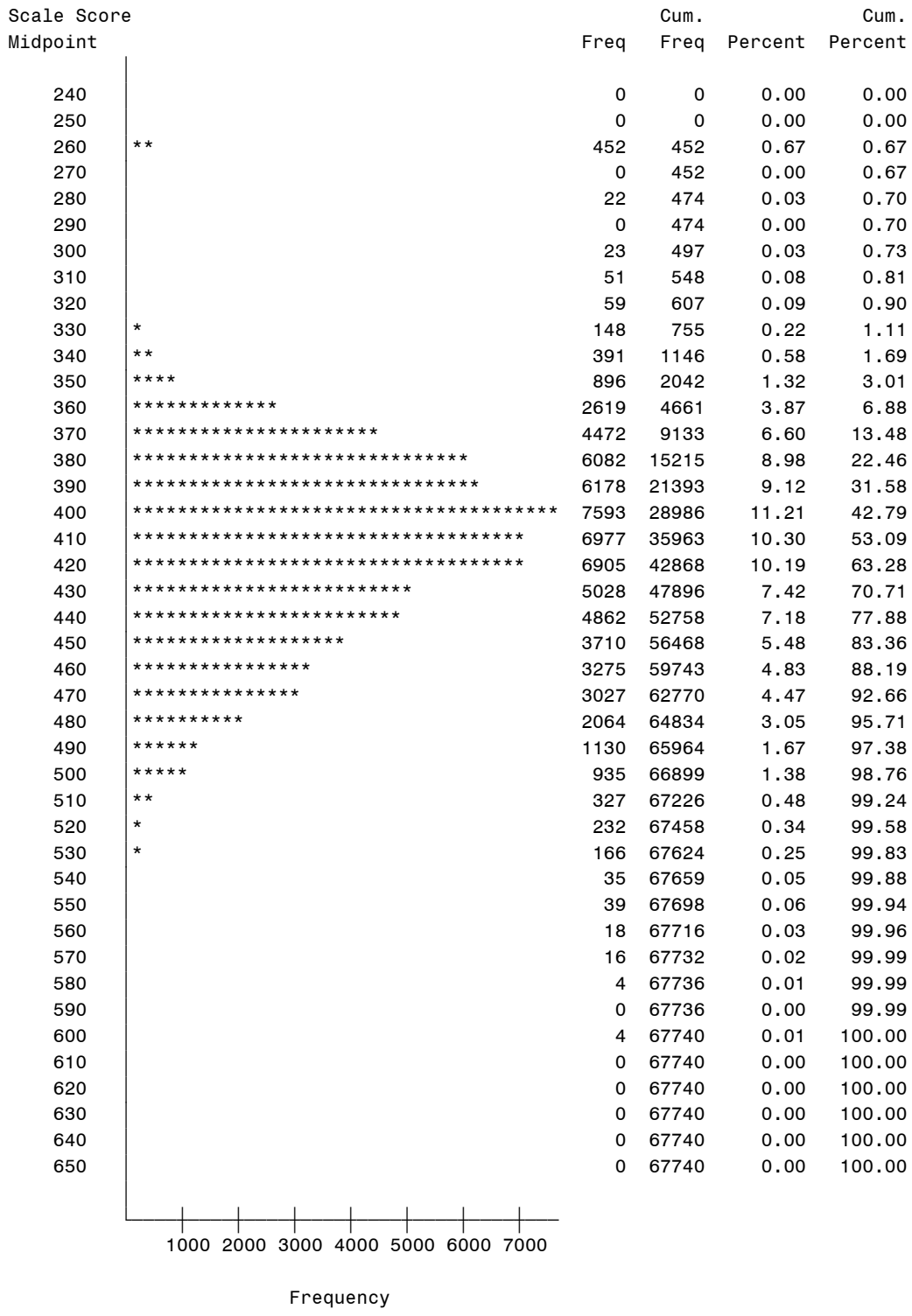


Figure B.35 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Cumulative Percent Differences between CDFs: Grade 7 Form F

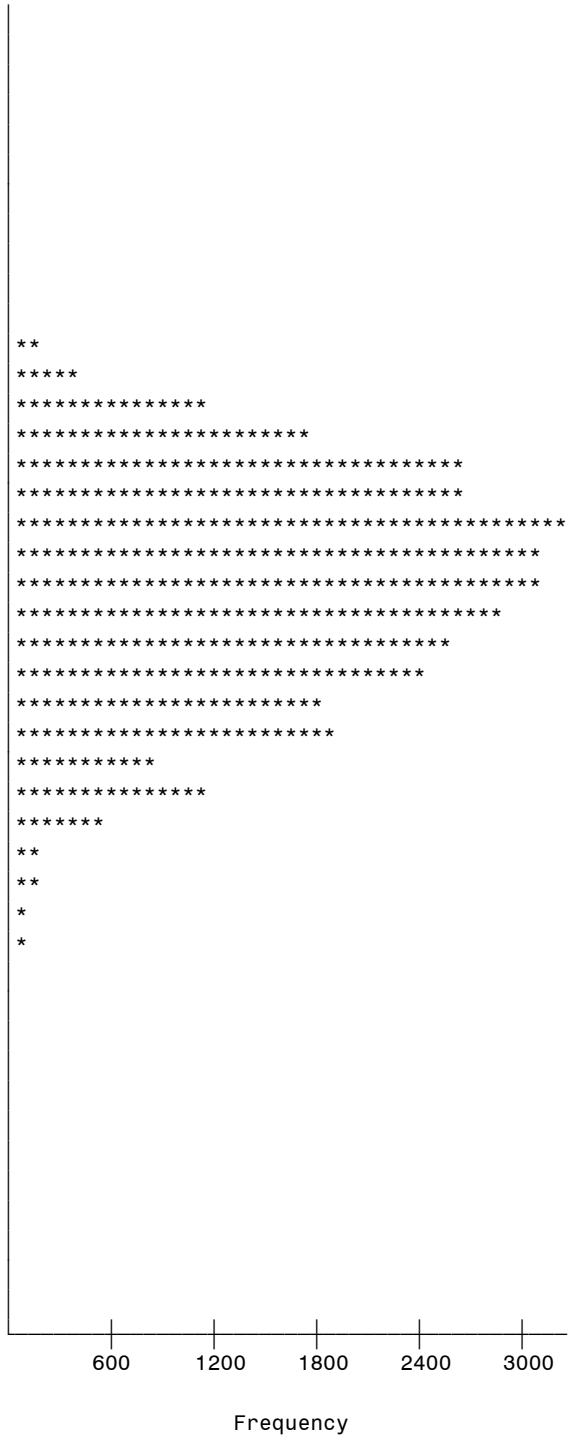
Year 2006 Grade=8



Scale Score Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
240		0	0	0.00	0.00
250		0	0	0.00	0.00
260	**	452	452	0.67	0.67
270		0	452	0.00	0.67
280		22	474	0.03	0.70
290		0	474	0.00	0.70
300		23	497	0.03	0.73
310		51	548	0.08	0.81
320		59	607	0.09	0.90
330	*	148	755	0.22	1.11
340	**	391	1146	0.58	1.69
350	****	896	2042	1.32	3.01
360	**********	2619	4661	3.87	6.88
370	**********	4472	9133	6.60	13.48
380	**********	6082	15215	8.98	22.46
390	**********	6178	21393	9.12	31.58
400	**********	7593	28986	11.21	42.79
410	**********	6977	35963	10.30	53.09
420	**********	6905	42868	10.19	63.28
430	**********	5028	47896	7.42	70.71
440	**********	4862	52758	7.18	77.88
450	**********	3710	56468	5.48	83.36
460	**********	3275	59743	4.83	88.19
470	**********	3027	62770	4.47	92.66
480	**********	2064	64834	3.05	95.71
490	******	1130	65964	1.67	97.38
500	*****	935	66899	1.38	98.76
510	**	327	67226	0.48	99.24
520	*	232	67458	0.34	99.58
530	*	166	67624	0.25	99.83
540		35	67659	0.05	99.88
550		39	67698	0.06	99.94
560		18	67716	0.03	99.96
570		16	67732	0.02	99.99
580		4	67736	0.01	99.99
590		0	67736	0.00	99.99
600		4	67740	0.01	100.00
610		0	67740	0.00	100.00
620		0	67740	0.00	100.00
630		0	67740	0.00	100.00
640		0	67740	0.00	100.00
650		0	67740	0.00	100.00

Figure B.36 Year 2006 Scale Score Distribution: Grade 8

Year 2008 Grade=8 Form=A



Scale Score Midpoint	Freq	Cum. Freq	Percent	Cum. Percent
240	0	0	0.00	0.00
250	0	0	0.00	0.00
260	0	0	0.00	0.00
270	5	5	0.02	0.02
280	0	5	0.00	0.02
290	9	14	0.03	0.04
300	0	14	0.00	0.04
310	16	30	0.05	0.09
320	25	55	0.08	0.17
330	37	92	0.11	0.28
340	144	236	0.45	0.73
350	387	623	1.20	1.93
360	1149	1772	3.56	5.48
370	1712	3484	5.30	10.78
380	2622	6106	8.11	18.89
390	2614	8720	8.09	26.98
400	3217	11937	9.95	36.94
410	3049	14986	9.43	46.37
420	3052	18038	9.44	55.81
430	2814	20852	8.71	64.52
440	2541	23393	7.86	72.38
450	2374	25767	7.35	79.73
460	1827	27594	5.65	85.38
470	1872	29466	5.79	91.18
480	810	30276	2.51	93.68
490	1113	31389	3.44	97.13
500	508	31897	1.57	98.70
510	160	32057	0.50	99.19
520	120	32177	0.37	99.56
530	71	32248	0.22	99.78
540	43	32291	0.13	99.92
550	0	32291	0.00	99.92
560	22	32313	0.07	99.98
570	0	32313	0.00	99.98
580	0	32313	0.00	99.98
590	5	32318	0.02	100.00
600	0	32318	0.00	100.00
610	0	32318	0.00	100.00
620	0	32318	0.00	100.00
630	0	32318	0.00	100.00
640	0	32318	0.00	100.00
650	0	32318	0.00	100.00

Figure B.37 Year 2008 Scale Score Distribution: Grade 8 Form A

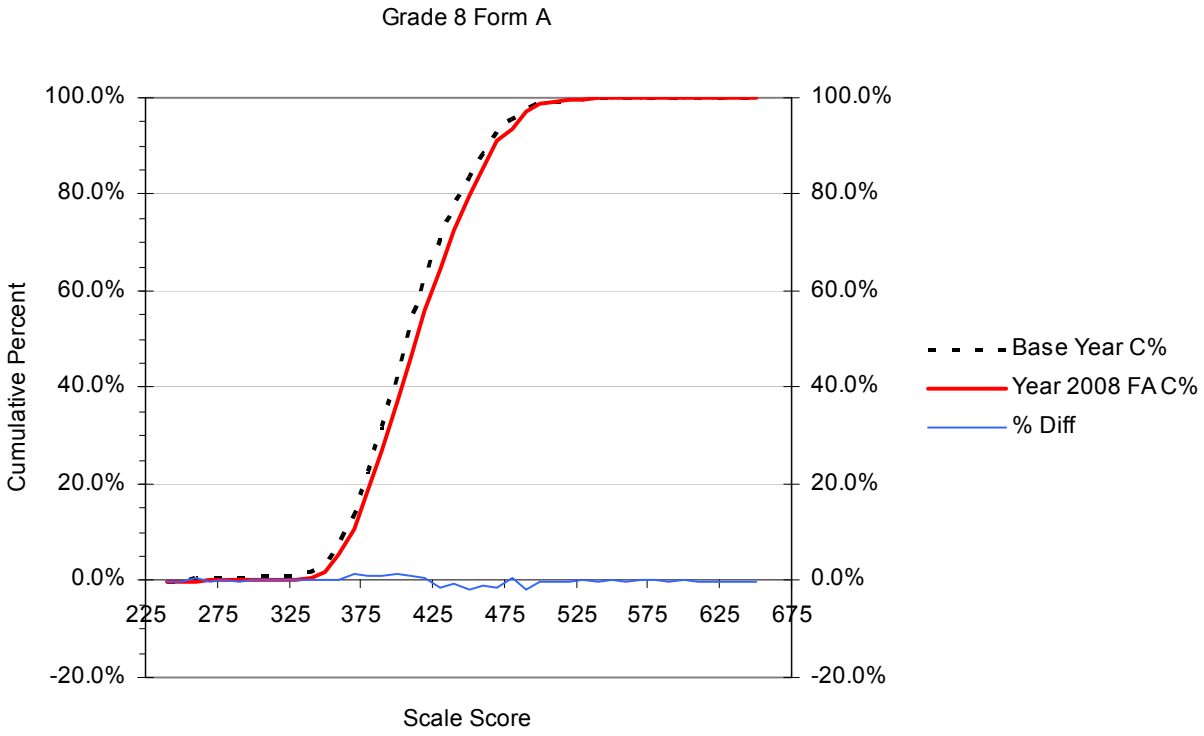


Figure B.38 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Percent Differences between CDFs: Grade 8 Form A

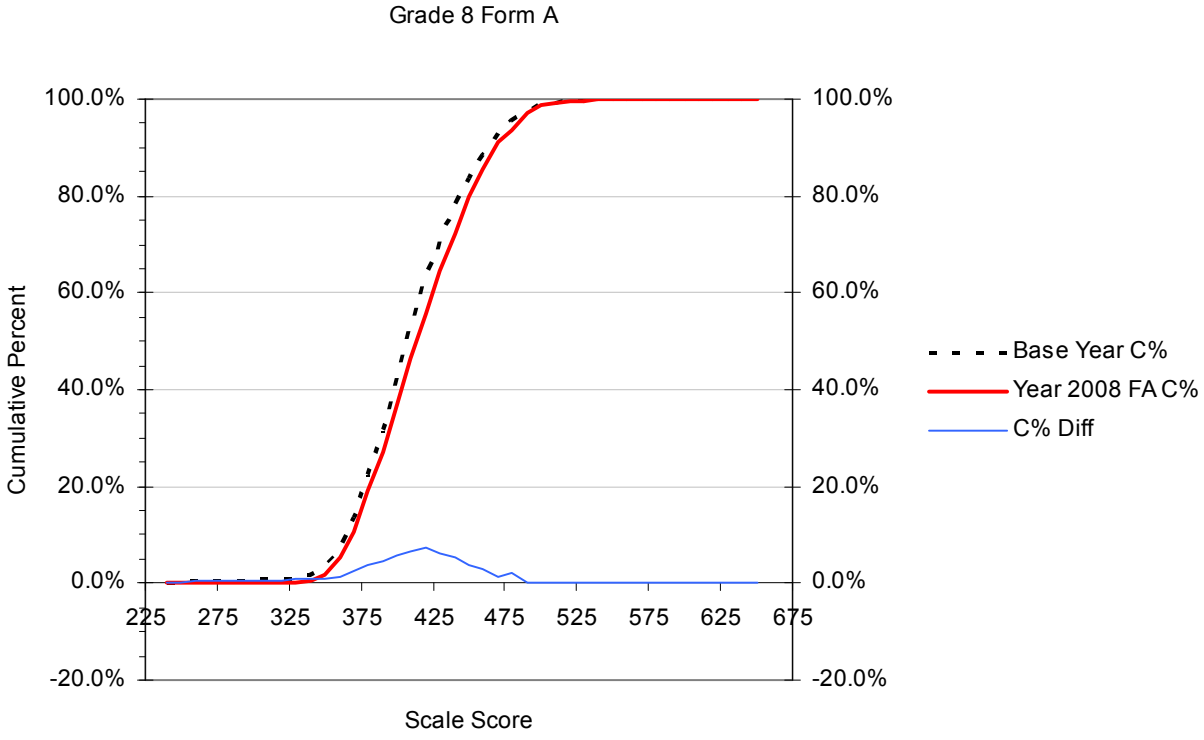
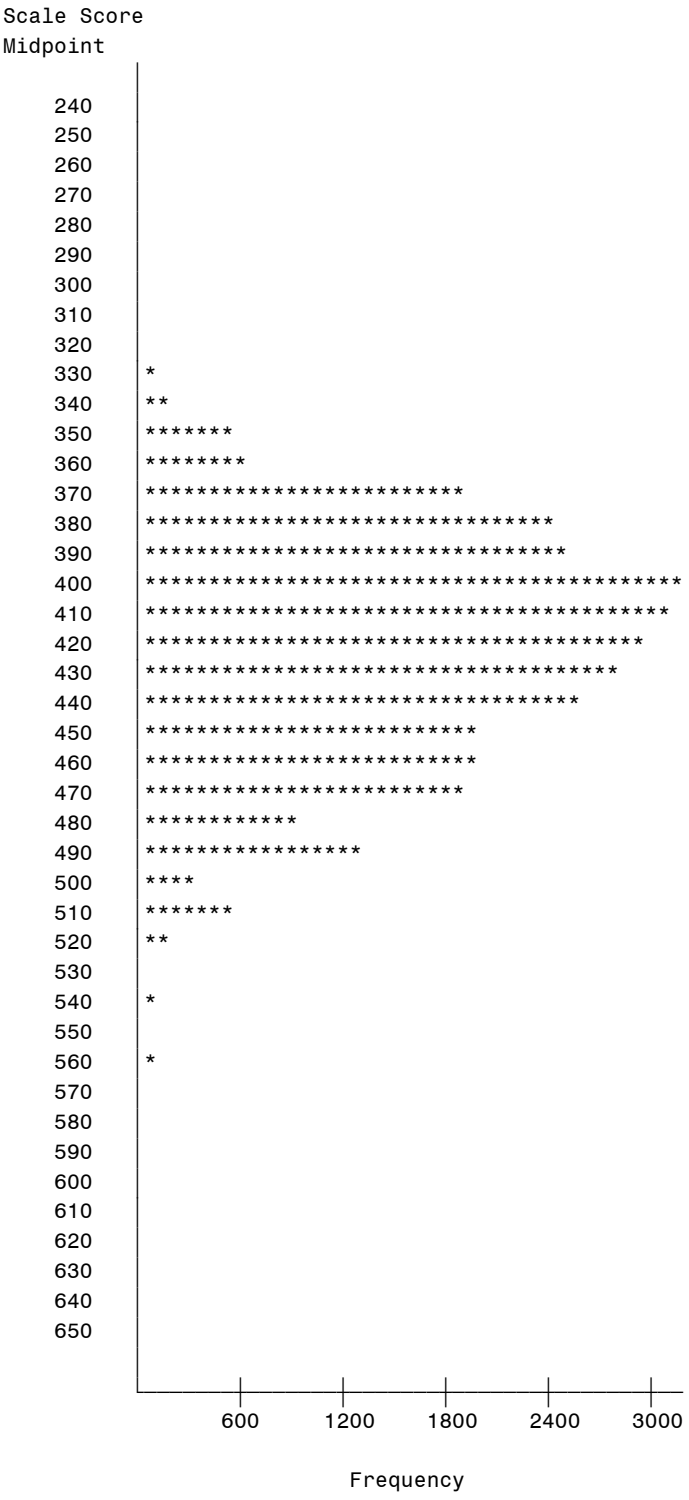


Figure B.39 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Cumulative Percent Differences between CDFs: Grade 8 Form A

Year 2008 Grade=8 Form=F



Scale Score Midpoint	Freq	Cum. Freq	Percent	Cum. Percent
240	0	0	0.00	0.00
250	0	0	0.00	0.00
260	5	5	0.02	0.02
270	0	5	0.00	0.02
280	13	18	0.04	0.06
290	0	18	0.00	0.06
300	7	25	0.02	0.08
310	10	35	0.03	0.11
320	33	68	0.10	0.21
330	43	111	0.14	0.35
340	162	273	0.51	0.86
350	557	830	1.75	2.61
360	633	1463	1.99	4.61
370	1869	3332	5.89	10.50
380	2380	5712	7.50	17.99
390	2502	8214	7.88	25.88
400	3132	11346	9.87	35.74
410	3039	14385	9.57	45.32
420	2944	17329	9.27	54.59
430	2756	20085	8.68	63.27
440	2530	22615	7.97	71.24
450	1944	24559	6.12	77.37
460	1972	26531	6.21	83.58
470	1885	28416	5.94	89.52
480	875	29291	2.76	92.28
490	1261	30552	3.97	96.25
500	314	30866	0.99	97.24
510	533	31399	1.68	98.92
520	175	31574	0.55	99.47
530	0	31574	0.00	99.47
540	109	31683	0.34	99.81
550	0	31683	0.00	99.81
560	49	31732	0.15	99.97
570	0	31732	0.00	99.97
580	11	31743	0.03	100.00
590	0	31743	0.00	100.00
600	0	31743	0.00	100.00
610	0	31743	0.00	100.00
620	0	31743	0.00	100.00
630	0	31743	0.00	100.00
640	0	31743	0.00	100.00
650	0	31743	0.00	100.00

Figure B.40 Year 2008 Scale Score Distribution: Grade 8 Form F

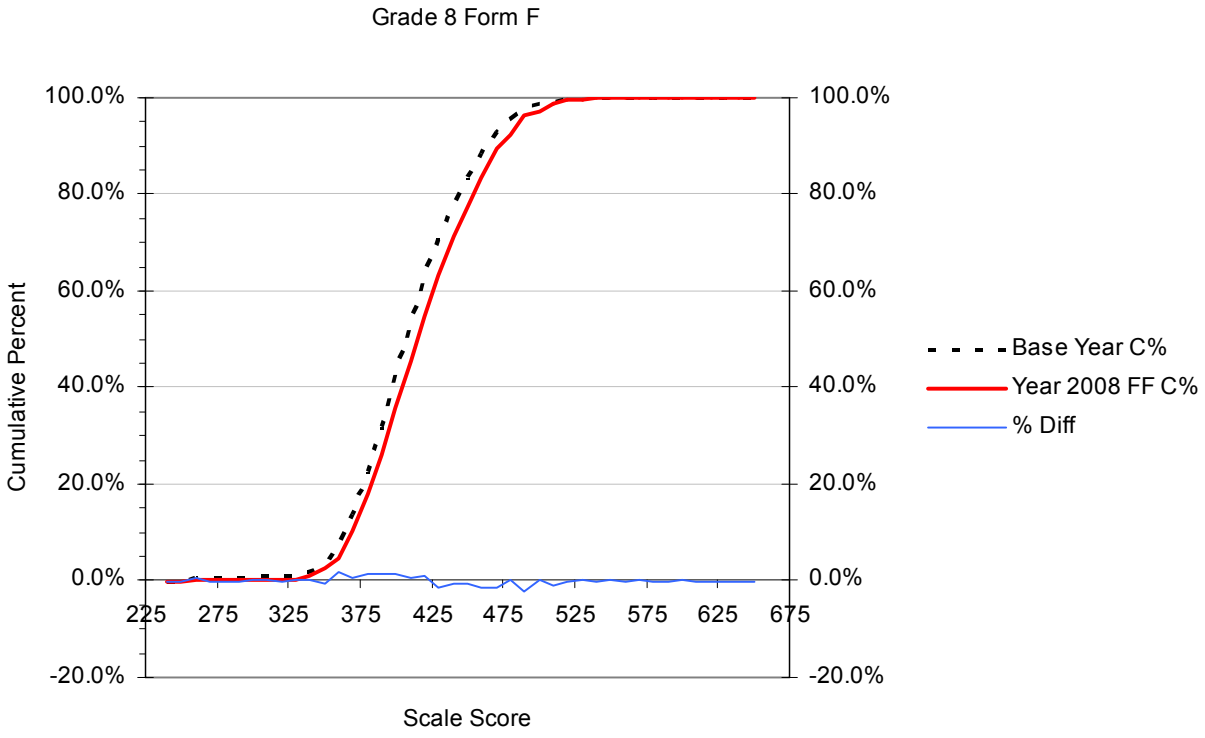


Figure B.41 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Percent Differences between CDFs: Grade 8 Form F

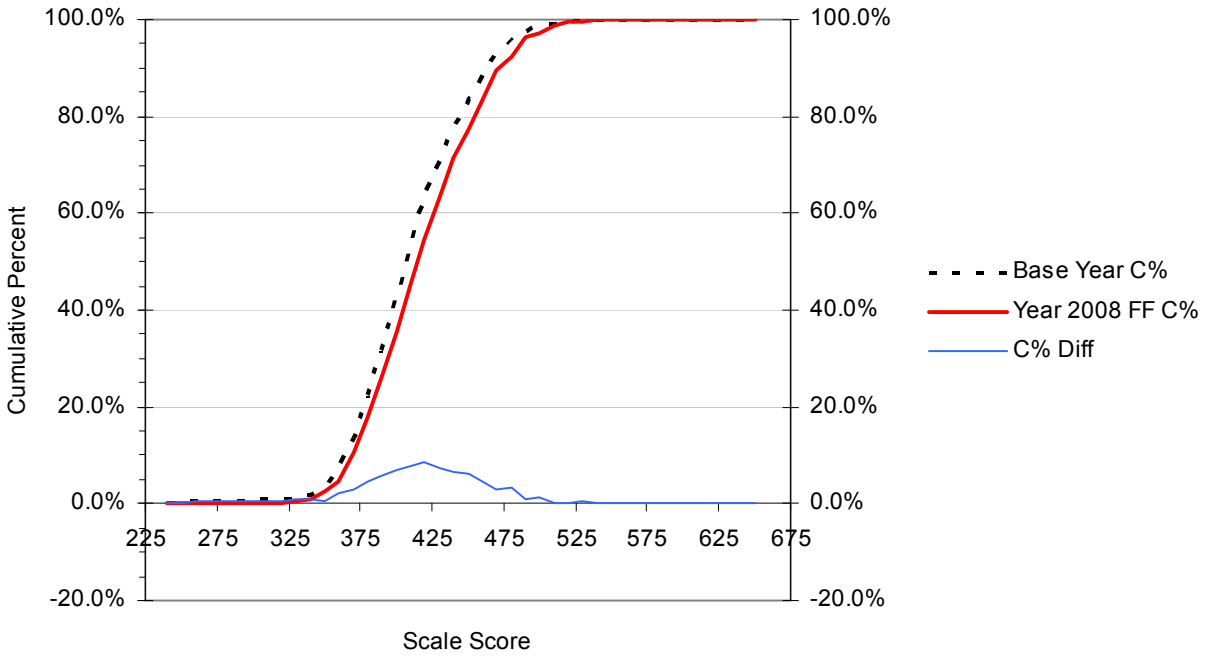


Figure B.42 Cumulative Distribution Functions (CDFs) for the Year 2006 vs. Year 2008 Scale Scores with the Cumulative Percent Differences between CDFs: Grade 8 Form F

APPENDIX C: THE 2008 MSA-MATH CLASSICAL AND RASCH ITEM PARAMETERS

Table C.1 The 2008 MSA-Math Classical and Rasch Item Parameters: Grade 3 Form A

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3509931	SR	0.68	0.35	0.9627	0.0443	1.03	1.06			
3548059	SR	0.74	0.55	0.6288	0.0467	0.83	0.70			
3509918	BCR	0.82	0.40	-0.1008	0.0549	0.99	0.99			
3595500	BCR	0.54	0.45	1.5690	0.0367	1.04	1.04	-1.8761	1.8761	
3510009	SR	0.84	0.36	0.0690	0.0526	0.93	0.88			
3509974	SR	0.65	0.21	1.0359	0.0440	1.30	1.52			
3548057	SR	0.80	0.35	0.5502	0.0474	0.91	0.87			
3509955	SR	0.61	0.34	1.8411	0.0415	1.07	1.17			
100000044161	SR	0.66	0.44	1.0707	0.0440	1.01	1.08			
3509959	SR	0.70	0.40	0.8740	0.0453	1.02	0.99			
3488196	SR	0.86	0.43	-0.4959	0.0622	0.94	0.76			
3509960	SR	0.78	0.34	0.3981	0.0494	1.00	1.00			
3509964	SR	0.79	0.51	-0.0360	0.0548	0.91	0.71			
3488126	SR	0.87	0.48	-0.8251	0.0691	0.81	0.53			
3509941	BCR	0.58	0.44	1.5122	0.0421	1.00	1.02			
3595501	BCR	0.54	0.51	1.5891	0.0362	0.97	0.96	-1.8002	1.8002	
3510068	SR	0.84	0.41	-0.3305	0.0585	1.00	0.99			
3510022	SR	0.52	0.32	2.0077	0.0415	1.11	1.19			
3509927	SR	0.81	0.30	0.4123	0.0487	0.98	1.15			
3510006	SR	0.59	0.48	1.2257	0.0430	0.96	0.99			
3496696	SR	0.77	0.26	0.3479	0.0493	1.17	1.32			
3509957	BCR	0.81	0.28	0.1115	0.0523	1.10	1.12			
3595502	BCR	0.43	0.49	2.3975	0.0356	0.99	0.98	-1.7280	1.7280	
3488123	SR	0.59	0.46	1.3765	0.0426	0.97	0.93			
3548507	SR	0.85	0.34	-0.2784	0.0578	1.03	0.94			
100000044159	SR	0.57	0.29	1.5712	0.0422	1.16	1.21			
3488038	SR	0.43	0.19	2.2208	0.0419	1.27	1.53			
3509935	SR	0.61	0.44	1.2515	0.0435	0.98	1.04			
3510066	SR	0.80	0.49	0.0425	0.0535	0.86	0.73			
3510073	BCR	0.79	0.39	0.2315	0.0506	1.00	1.02			
3595503	BCR	0.59	0.40	1.1948	0.0376	1.09	1.10	-1.9764	1.9764	
3510125	SR	0.57	0.46	1.6971	0.0416	0.91	0.88			
3510072	BCR	0.85	0.41	-0.2447	0.0570	0.94	0.98			
3595504	BCR	0.60	0.49	1.5000	0.0292	1.16	1.16	-0.5243	0.5243	
100000044163	SR	0.76	0.36	-0.4817	0.0613	1.87	2.22			
3509926	SR	0.39	0.41	2.4187	0.0421	0.96	1.05			
100000044152	SR	0.87	0.34	-0.3864	0.0595	1.03	1.01			
3509961	SR	0.92	0.36	-1.3667	0.0827	1.28	1.18			
3510065	SR	0.94	0.28	-2.1822	0.1153	1.30	1.12			

Table C.1 (continued)

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3510063	SR	0.78	0.45	0.4861	0.0481	0.87	0.82			
100000044158	SR	0.86	0.44	-0.4990	0.0616	1.03	0.86			
3510018	SR	0.79	0.49	0.2953	0.0499	0.89	0.73			
3510035	SR	0.89	0.30	-0.6165	0.0637	0.92	1.26			
3510060	BCR	0.86	0.28	-0.4451	0.0607	1.09	1.22			
3595505	BCR	0.58	0.48	1.3069	0.0354	0.99	0.99	-1.7023	1.7023	
3510055	SR	0.62	0.47	1.2952	0.0428	0.92	0.90			
3510027	SR	0.87	0.40	-0.5906	0.0633	1.02	0.88			
3510347	SR	0.74	0.46	0.9229	0.0449	0.83	0.78			
3510053	SR	0.84	0.29	-0.2691	0.0574	1.16	1.31			
3510058	SR	0.88	0.43	-0.6059	0.0635	0.93	0.88			
3510051	SR	0.57	0.45	1.4814	0.0421	0.96	0.95			
3509929	SR	0.54	0.46	1.8021	0.0418	0.95	0.97			
3510329	SR	0.56	0.33	1.5719	0.0419	1.12	1.21			
3510033	SR	0.82	0.34	0.0473	0.0529	1.03	1.08			
3510043	SR	0.77	0.39	0.0444	0.0529	1.15	1.11			
3510012	SR	0.80	0.47	0.0993	0.0522	0.97	0.83			
3487779	SR	0.85	0.56	-0.2992	0.0579	0.79	0.55			
3509962	SR	0.90	0.41	-0.6247	0.0638	0.78	0.66			
3510034	BCR	0.35	0.44	2.6680	0.0428	0.93	0.91			
3595506	BCR	0.38	0.54	2.6710	0.0340	0.90	0.89	-1.4737	1.4737	
3488178	SR	0.53	0.45	1.7968	0.0415	0.99	1.04			
3496700	SR	0.88	0.34	-0.6248	0.0639	1.00	0.91			
3509950	SR	0.71	0.33	0.8475	0.0453	1.05	1.02			
3490570	SR	0.87	0.35	-0.4471	0.0607	1.02	1.05			
3510036	SR	0.85	0.39	-0.5397	0.0626	0.97	0.92			

Table C.2 The 2008 MSA-Mathematics Classical and Rasch Item Parameters: Grade 3 Form F

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3509931	SR	0.70	0.35	0.9627	0.0450	1.10	1.08			
3548059	SR	0.77	0.53	0.6288	0.0475	0.82	0.68			
3509918	BCR	0.83	0.42	0.0751	0.0533	0.98	0.94			
3595500	BCR	0.55	0.42	1.6361	0.0375	1.06	1.07	-1.9848	1.9848	
3510009	SR	0.84	0.36	0.0690	0.0534	0.94	0.82			
3509974	SR	0.66	0.22	1.0359	0.0446	1.32	1.49			
3548057	SR	0.81	0.34	0.5502	0.0481	0.96	1.06			
3509955	SR	0.63	0.34	1.8411	0.0419	1.11	1.21			
100000044160	SR	0.93	0.32	-1.1760	0.0780	0.98	1.04			
3509959	SR	0.72	0.38	0.8740	0.0458	1.01	0.97			
3488196	SR	0.89	0.40	-0.7392	0.0677	0.92	0.70			
3509960	SR	0.81	0.32	0.3981	0.0500	0.97	1.00			
3509964	SR	0.82	0.50	-0.0360	0.0552	0.92	0.77			
3509956	SR	0.66	0.27	1.1953	0.0442	1.20	1.32			
3509941	BCR	0.58	0.42	1.6893	0.0422	1.05	1.09			
3595501	BCR	0.56	0.49	1.6043	0.0362	0.98	0.98	-1.8082	1.8082	
3510068	SR	0.88	0.40	-0.3305	0.0594	0.86	1.02			
3510022	SR	0.53	0.31	2.0077	0.0418	1.14	1.24			
3509927	SR	0.80	0.28	0.4123	0.0495	1.08	1.35			
3510006	SR	0.60	0.48	1.2257	0.0436	1.01	1.08			
3487972	SR	0.51	0.42	2.0271	0.0418	1.00	1.00			
3509922	BCR	0.68	0.45	1.0913	0.0449	1.00	0.97			
3595507	BCR	0.37	0.50	3.2375	0.0387	0.94	0.93	-2.1210	2.1210	
100000044153	SR	0.89	0.30	-0.6268	0.0651	1.03	1.08			
3510126	SR	0.77	0.44	0.1797	0.0522	1.16	1.10			
100000044159	SR	0.59	0.29	1.5483	0.0427	1.19	1.27			
100000044154	SR	0.88	0.29	-0.2581	0.0586	0.86	0.77			
3509935	SR	0.63	0.43	1.2515	0.0441	1.02	1.02			
3510066	SR	0.82	0.48	0.0425	0.0543	0.89	0.69			
3510067	BCR	0.85	0.36	-0.2338	0.0579	1.02	1.03			
3595508	BCR	0.80	0.36	0.1995	0.0369	1.23	1.40	-0.9490	0.9490	
3488069	SR	0.89	0.30	-0.5610	0.0635	1.05	1.10			
3509924	BCR	0.62	0.51	1.5222	0.0426	0.93	0.94			
3595509	BCR	0.39	0.55	3.0387	0.0385	0.90	0.89	-2.0994	2.0994	
3488171	SR	0.74	0.52	0.7136	0.0469	0.90	0.80			
3509926	SR	0.47	0.46	2.4187	0.0423	0.99	0.99			
3488127	SR	0.78	0.51	0.3755	0.0500	0.93	0.77			

Table C.2 (continued)

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3509961	SR	0.92	0.35	-1.3667	0.0839	1.13	1.01			
3510065	SR	0.95	0.25	-2.1822	0.1166	1.32	1.45			
3510063	SR	0.78	0.44	0.4861	0.0489	0.89	0.82			
100000044158	SR	0.86	0.46	-0.4990	0.0624	1.14	0.98			
3510018	SR	0.79	0.51	0.2953	0.0507	0.93	0.77			
3510035	SR	0.89	0.28	-0.6165	0.0645	1.03	1.37			
3510060	BCR	0.87	0.27	-0.3562	0.0600	1.07	1.12			
3595505	BCR	0.60	0.47	1.2218	0.0369	0.97	0.98	-1.8923	1.8923	
3510055	SR	0.62	0.48	1.2952	0.0434	0.95	0.94			
3510027	SR	0.87	0.38	-0.5906	0.0643	1.02	0.96			
3510347	SR	0.76	0.43	0.9229	0.0455	0.88	0.82			
3510053	SR	0.85	0.28	-0.2691	0.0582	1.14	1.35			
3510058	SR	0.88	0.42	-0.6059	0.0643	1.01	1.02			
3510051	SR	0.57	0.46	1.4814	0.0427	0.99	0.98			
3509929	SR	0.55	0.47	1.8021	0.0422	0.93	0.91			
3510329	SR	0.57	0.35	1.5719	0.0424	1.16	1.21			
3510033	SR	0.84	0.32	0.0473	0.0538	1.01	1.02			
3510043	SR	0.79	0.40	0.0444	0.0538	1.16	1.19			
3510012	SR	0.81	0.48	0.0993	0.0532	0.96	0.77			
3488033	SR	0.89	0.56	-0.5440	0.0632	0.78	0.48			
3509962	SR	0.91	0.41	-0.6247	0.0647	0.76	0.70			
3509932	BCR	0.98	0.25	-2.7407	0.1484	0.95	0.44			
3595510	BCR	0.44	0.53	2.4652	0.0353	0.92	0.93	-1.6902	1.6902	
3490561	SR	0.91	0.27	-0.8923	0.0707	1.06	1.08			
3510020	SR	0.85	0.47	-0.1123	0.0560	0.93	0.81			
100000044162	SR	0.84	0.40	-0.0075	0.0548	0.99	0.98			
3490570	SR	0.87	0.38	-0.5043	0.0627	0.99	0.92			
3510036	SR	0.86	0.40	-0.5397	0.0635	1.05	0.96			

Table C.3 The 2008 MSA-Mathematics Classical and Rasch Item Parameters: Grade 4 Form A

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3515406	SR	0.66	0.42	0.6241	0.0437	1.02	1.04			
3515407	SR	0.87	0.41	-0.7990	0.0561	0.93	0.83			
100000044146	SR	0.92	0.19	-1.8595	0.0785	1.26	2.69			
100000044148	BCR	0.36	0.36	2.0901	0.0433	1.08	1.11			
3595498	BCR	0.58	0.49	0.7602	0.0371	0.97	0.96	-1.9452	1.9452	
3515408	SR	0.78	0.50	0.1763	0.0460	0.80	0.67			
3515641	SR	0.81	0.47	-0.8522	0.0570	1.19	1.09			
3515410	SR	0.88	0.36	-1.0550	0.0602	0.98	0.86			
3487996	SR	0.77	0.26	-0.0097	0.0474	1.18	1.27			
3515605	SR	0.63	0.52	0.9009	0.0428	0.90	0.85			
3488056	SR	0.53	0.31	1.3222	0.0422	1.22	1.31			
3488159	SR	0.88	0.36	-1.1317	0.0617	0.97	1.07			
3515447	SR	0.54	0.48	1.4979	0.0421	0.96	0.97			
100000044142	BCR	0.83	0.38	-0.5527	0.0529	0.99	0.95			
3595499	BCR	0.46	0.50	1.8966	0.0388	0.95	0.94	-2.1375	2.1375	
3515604	SR	0.70	0.53	0.3940	0.0448	0.87	0.88			
3515737	SR	0.84	0.30	-0.7461	0.0554	1.06	1.12			
3515576	SR	0.66	0.38	0.5508	0.0440	1.05	1.03			
3515470	SR	0.74	0.40	0.0797	0.0467	1.01	1.00			
3515643	SR	0.44	0.48	1.7570	0.0424	0.91	0.91			
3515645	SR	0.74	0.36	-0.1355	0.0485	1.13	1.18			
3515648	BCR	0.55	0.57	1.2519	0.0422	0.82	0.76			
3595531	BCR	0.58	0.64	0.9986	0.0301	0.83	0.80	-0.6913	0.6913	
3515559	SR	0.70	0.40	0.1734	0.0461	1.07	1.16			
3515426	SR	0.49	0.41	1.6228	0.0424	1.06	1.10			
3515571	SR	0.82	0.44	-0.9395	0.0586	1.20	1.19			
100000044144	SR	0.95	0.19	-2.7781	0.1143	1.01	1.18			
3515421	SR	0.87	0.36	-0.6701	0.0543	0.89	0.93			
3515574	SR	0.88	0.45	-0.9677	0.0588	0.80	0.65			
3515823	BCR	0.46	0.54	1.6468	0.0423	0.89	0.85			
3595532	BCR	0.42	0.56	2.0517	0.0353	0.92	0.91	-1.6746	1.6746	
100000044149	SR	0.98	0.11	-3.4118	0.1510	1.01	1.41			
3548767	SR	0.73	0.33	0.0868	0.0468	1.13	1.20			
3515807	BCR	0.75	0.36	0.0553	0.0472	1.09	1.09			
3595533	BCR	0.39	0.44	2.2474	0.0333	1.16	1.14	-1.2842	1.2842	
3488052	SR	0.62	0.45	0.7943	0.0431	0.98	0.94			
3515575	SR	0.89	0.39	-1.3667	0.0664	0.93	0.76			

Table C.3 (continued)

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3515705	SR	0.83	0.31	-0.2051	0.0491	0.95	0.98			
3515471	SR	0.87	0.36	-0.9767	0.0589	1.05	0.87			
3515630	SR	0.54	0.48	0.9291	0.0427	1.00	0.97			
3515886	BCR	0.57	0.47	1.1277	0.0423	0.99	1.01			
3595534	BCR	0.57	0.42	0.8438	0.0377	1.08	1.09	-2.0080	2.0080	
3515787	SR	0.55	0.31	1.1443	0.0423	1.17	1.26			
3515533	SR	0.85	0.48	-0.7839	0.0561	0.86	0.74			
3515631	SR	0.79	0.37	-0.4674	0.0519	1.15	1.16			
3515486	SR	0.60	0.41	0.7468	0.0433	1.08	1.08			
3515484	SR	0.92	0.30	-1.7626	0.0760	1.01	1.33			
3497876	SR	0.63	0.49	0.7358	0.0433	0.93	0.89			
3515543	SR	0.82	0.50	-0.2743	0.0499	0.77	0.67			
3515853	SR	0.81	0.45	-0.1060	0.0485	0.81	0.68			
3497869	SR	0.81	0.22	-0.5937	0.0534	1.13	1.16			
3548078	SR	0.51	0.41	1.3598	0.0421	1.03	1.06			
3515933	SR	0.77	0.24	-0.3619	0.0507	1.26	1.61			
3515519	SR	0.88	0.37	-0.6898	0.0547	0.82	0.92			
3515795	SR	0.66	0.48	0.5626	0.0440	0.95	0.88			
3515545	SR	0.88	0.40	-0.8464	0.0569	0.84	0.67			
3548086	SR	0.82	0.39	-0.2943	0.0500	0.91	0.87			
3515843	BCR	0.90	0.36	-1.3684	0.0663	0.93	0.95			
3595535	BCR	0.68	0.47	0.0715	0.0361	1.07	1.10	-1.6202	1.6202	
3497867	SR	0.65	0.39	0.5913	0.0438	1.06	1.16			
3515506	SR	0.91	0.37	-1.2169	0.0634	0.80	0.68			
3515887	SR	0.87	0.29	-1.4589	0.0684	1.39	1.66			
3515632	SR	0.70	0.51	-0.0118	0.0476	1.02	0.96			
3548088	SR	0.77	0.43	-0.1831	0.0491	0.96	0.97			

Table C.4 The 2008 MSA-Mathematics Classical and Rasch Item Parameters: Grade 4 Form F

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3515406	SR	0.66	0.45	0.6241	0.0434	0.96	0.96			
3515407	SR	0.87	0.43	-0.7990	0.0552	0.83	0.67			
100000044150	SR	0.66	0.33	0.5597	0.0436	1.13	1.16			
3515595	BCR	0.81	0.46	-0.4856	0.0514	0.92	0.74			
3595536	BCR	0.50	0.56	1.4296	0.0348	0.93	0.92	-1.6389	1.6389	
3515408	SR	0.78	0.52	0.1763	0.0456	0.76	0.64			
3515641	SR	0.81	0.49	-0.8522	0.0560	1.08	0.96			
3515410	SR	0.87	0.35	-1.0550	0.0591	0.98	0.83			
3497882	SR	0.78	0.32	-0.1920	0.0484	1.09	1.09			
3515605	SR	0.62	0.51	0.9009	0.0426	0.90	0.87			
3497866	SR	0.71	0.36	0.2397	0.0453	1.09	1.08			
3515582	SR	0.82	0.23	-0.4742	0.0512	1.18	1.45			
3515447	SR	0.52	0.48	1.4979	0.0421	0.98	1.07			
100000044142	BCR	0.86	0.37	-0.9256	0.0571	0.99	0.99			
3595499	BCR	0.47	0.48	1.7707	0.0404	0.97	0.97	-2.2938	2.2938	
3515604	SR	0.68	0.52	0.3940	0.0445	0.91	0.83			
3515737	SR	0.84	0.29	-0.7523	0.0546	1.07	1.41			
3515576	SR	0.65	0.39	0.5508	0.0437	1.03	0.99			
3515470	SR	0.74	0.39	0.0797	0.0463	1.04	1.04			
3515643	SR	0.45	0.45	1.7570	0.0425	0.99	1.04			
3515645	SR	0.75	0.36	-0.1355	0.0479	1.13	1.19			
3515648	BCR	0.55	0.56	1.1199	0.0422	0.88	0.82			
3595531	BCR	0.58	0.63	0.9347	0.0307	0.91	0.89	-0.8467	0.8467	
3551599	SR	0.82	0.54	-0.5617	0.0523	0.82	0.61			
3488180	SR	0.86	0.43	-0.9544	0.0577	0.93	0.77			
3515571	SR	0.81	0.45	-0.9395	0.0575	1.18	1.38			
100000044145	SR	0.96	0.25	-2.1504	0.0852	0.62	0.38			
3515421	SR	0.86	0.36	-0.6701	0.0535	0.87	0.75			
3488166	SR	0.80	0.47	-0.4437	0.0509	0.92	0.84			
3515646	BCR	0.63	0.56	0.6734	0.0432	0.86	0.80			
3595537	BCR	0.61	0.59	0.8984	0.0280	1.03	0.97	0.1686	-0.1686	
3488190	SR	0.56	0.42	0.9747	0.0424	1.00	1.00			
3488060	SR	0.99	0.08	-3.8290	0.1749	1.01	2.46			
3515807	BCR	0.78	0.37	-0.2581	0.0491	1.06	1.00			
3595533	BCR	0.34	0.42	2.6447	0.0365	1.11	1.11	-1.7531	1.7531	
3490562	SR	0.53	0.38	1.1949	0.0421	1.09	1.12			
3515575	SR	0.87	0.44	-1.1384	0.0606	0.87	0.67			

Table C.4 (continued)

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3488019	SR	0.66	0.27	0.5462	0.0438	1.25	1.49			
3515471	SR	0.86	0.37	-0.9767	0.0579	1.06	0.93			
3515630	SR	0.54	0.48	0.9291	0.0425	0.99	0.99			
3515783	BCR	0.76	0.55	-0.0713	0.0474	0.85	0.74			
3595560	BCR	0.74	0.60	0.1264	0.0318	0.92	0.95	-0.3519	0.3519	
3515935	SR	0.86	0.32	-0.8732	0.0563	1.03	1.23			
3515785	SR	0.72	0.26	0.1771	0.0457	1.21	1.29			
3515631	SR	0.79	0.36	-0.4674	0.0512	1.14	1.25			
3515486	SR	0.58	0.39	0.7468	0.0431	1.11	1.15			
100000044143	SR	0.75	0.48	0.2215	0.0454	0.86	0.79			
3488189	SR	0.82	0.45	-0.7062	0.0542	0.93	0.98			
3502604	SR	0.80	0.39	-0.4877	0.0517	0.98	1.01			
3515853	SR	0.79	0.43	-0.1060	0.0481	0.85	0.82			
3515836	SR	0.59	0.43	0.6346	0.0434	1.09	1.18			
3548078	SR	0.52	0.41	1.2468	0.0421	1.05	1.12			
3515933	SR	0.78	0.25	-0.3619	0.0500	1.23	1.60			
3515635	SR	0.55	0.42	0.6901	0.0431	1.12	1.24			
3515795	SR	0.63	0.47	0.5626	0.0436	1.00	0.93			
3515545	SR	0.88	0.40	-0.8464	0.0559	0.80	0.64			
3548086	SR	0.80	0.40	-0.2943	0.0494	0.94	1.01			
3515830	BCR	0.95	0.26	-2.2268	0.0873	0.96	0.98			
3595561	BCR	0.78	0.33	-0.5908	0.0376	1.24	1.39	-1.3955	1.3955	
3548079	SR	0.96	0.34	-2.0300	0.0811	0.69	0.38			
3515506	SR	0.92	0.33	-1.2169	0.0619	0.75	0.59			
3515887	SR	0.91	0.33	-1.4589	0.0666	0.97	0.91			
3515632	SR	0.72	0.50	-0.0118	0.0470	0.97	0.87			
3548088	SR	0.77	0.42	-0.1831	0.0484	0.99	1.02			

Table C.5 The 2008 MSA-Mathematics Classical and Rasch Item Parameters: Grade 5 Form A

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3511312	SR	0.42	0.36	1.5795	0.0426	1.09	1.14			
3511269	SR	0.89	0.26	-1.0845	0.0572	0.92	0.93			
3512642	SR	0.63	0.45	0.4442	0.0435	0.99	0.96			
3511531	BCR	0.69	0.52	0.1259	0.0450	0.92	0.87			
3595438	BCR	0.60	0.52	0.5335	0.0336	1.00	1.01	-1.3908	1.3908	
3488390	SR	0.43	0.37	1.4804	0.0424	1.11	1.17			
3512622	SR	0.67	0.49	0.2133	0.0445	0.95	0.87			
3511203	SR	0.91	0.38	-1.6829	0.0687	0.86	0.51			
3488506	SR	0.39	0.44	1.7536	0.0431	0.97	0.99			
3512535	SR	0.54	0.32	0.9885	0.0422	1.15	1.23			
3511196	SR	0.57	0.51	0.6094	0.0433	0.95	0.96			
3511307	SR	0.42	0.34	1.5483	0.0429	1.16	1.25			
3488373	SR	0.67	0.42	0.1790	0.0457	1.03	1.03			
3511467	SR	0.82	0.40	-0.9093	0.0556	0.89	0.76			
3512529	SR	0.58	0.24	0.4459	0.0445	1.29	1.41			
3511339	SR	0.65	0.52	0.4633	0.0434	0.89	0.85			
3512639	SR	0.79	0.37	-0.4690	0.0496	1.04	1.00			
100000043853	SR	0.67	0.40	0.3350	0.0441	1.02	1.06			
3512615	BCR	0.79	0.50	-0.5151	0.0502	0.88	0.93			
3595439	BCR	0.54	0.52	0.8697	0.0337	1.01	1.00	-1.4537	1.4537	
3511216	SR	0.71	0.25	0.2030	0.0447	1.17	1.21			
3512638	SR	0.74	0.46	0.2606	0.0444	0.88	0.83			
3512691	SR	0.60	0.33	1.0014	0.0423	1.14	1.18			
3512702	SR	0.50	0.31	0.8431	0.0425	1.21	1.36			
3511336	BCR	0.42	0.54	1.4848	0.0434	0.88	0.81			
3595440	BCR	0.38	0.63	1.7477	0.0316	0.85	0.81	-0.8139	0.8139	
3511566	SR	0.66	0.42	0.1548	0.0452	1.04	1.06			
3511246	SR	0.76	0.46	-0.3310	0.0488	0.92	0.80			
3511458	SR	0.87	0.36	-1.7042	0.0700	1.11	0.86			
3511479	SR	0.61	0.43	0.6218	0.0429	1.00	1.00			
3511504	SR	0.88	0.27	-1.2550	0.0601	1.03	1.23			
3488324	SR	0.75	0.52	-0.2851	0.0479	0.88	0.77			
3511513	SR	0.85	0.38	-1.1293	0.0580	1.00	0.95			
3488272	SR	0.56	0.36	0.8010	0.0425	1.08	1.08			
3511258	ECR	0.85	0.38	-1.0546	0.0571	0.97	0.92			
3595441	ECR	0.51	0.52	0.9016	0.0351	0.98	0.98	-3.8291	0.2550	3.5741
3511266	SR	0.70	0.42	0.0148	0.0458	1.06	1.02			

Table C.5 (continued)

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3488431	SR	0.74	0.28	-0.2130	0.0473	1.16	1.44			
3511470	SR	0.86	0.36	-0.6898	0.0520	0.84	0.73			
3511499	SR	0.63	0.53	0.1746	0.0448	0.96	0.95			
3511330	SR	0.61	0.32	0.6342	0.0431	1.15	1.18			
3556476	BCR	0.50	0.52	1.2085	0.0424	0.92	0.89			
3595442	BCR	0.44	0.63	1.3852	0.0272	0.92	0.83	0.6408	-0.6408	
3511348	SR	0.56	0.40	0.8880	0.0425	1.06	1.12			
3512595	SR	0.81	0.36	-0.6828	0.0520	1.02	1.16			
3511521	SR	0.63	0.52	0.2895	0.0443	0.92	0.84			
3488241	SR	0.92	0.26	-1.7928	0.0716	1.01	1.21			
100000043857	SR	0.83	0.39	-0.9439	0.0555	0.96	1.15			
3511376	SR	0.88	0.37	-0.9892	0.0558	0.75	0.74			
3511396	SR	0.89	0.38	-1.1516	0.0583	0.76	0.63			
3511429	SR	0.77	0.43	-0.5025	0.0499	1.05	1.10			
3512618	BCR	0.47	0.54	1.3098	0.0426	0.87	0.82			
3595443	BCR	0.56	0.49	0.5173	0.0408	0.94	0.93	-2.2969	2.2969	
3512623	SR	0.79	0.41	-0.5862	0.0509	0.97	0.87			
3512625	SR	0.91	0.29	-1.6381	0.0681	0.85	0.99			
3511631	SR	0.78	0.41	-0.3862	0.0495	0.87	0.77			
3488251	SR	0.61	0.35	0.5581	0.0432	1.13	1.12			
3511439	SR	0.77	0.46	-0.5779	0.0509	0.98	0.81			
3512564	BCR	0.37	0.40	1.7934	0.0436	1.02	1.06			
3595444	BCR	0.35	0.42	2.3824	0.0376	1.09	1.09	-1.8916	1.8916	
3511442	SR	0.63	0.48	0.5383	0.0433	0.94	0.91			
3512644	BCR	0.37	0.58	1.8531	0.0441	0.80	0.73			
3595445	BCR	0.47	0.64	1.3274	0.0316	0.88	0.86	-0.9532	0.9532	
3488328	SR	0.71	0.43	-0.0717	0.0467	0.99	0.96			
3511448	SR	0.78	0.38	-0.6839	0.0524	1.16	1.30			

Table C.6 The 2008 MSA-Mathematics Classical and Rasch Item Parameters: Grade 5 Form F

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3511312	SR	0.41	0.36	1.5795	0.0429	1.08	1.16			
3511269	SR	0.89	0.27	-1.0845	0.0588	0.83	0.80			
3512642	SR	0.62	0.43	0.5603	0.0438	1.03	1.09			
3511531	BCR	0.71	0.51	0.0205	0.0466	0.93	0.87			
3595438	BCR	0.62	0.50	0.3914	0.0358	1.05	1.05	-1.6521	1.6521	
3488390	SR	0.44	0.37	1.5155	0.0428	1.11	1.16			
3512622	SR	0.68	0.51	0.1285	0.0458	0.94	0.86			
3511203	SR	0.92	0.34	-1.8304	0.0744	0.94	0.71			
3488356	SR	0.78	0.36	-0.4351	0.0504	1.08	1.11			
3512535	SR	0.56	0.30	0.9885	0.0427	1.20	1.30			
3511196	SR	0.58	0.53	0.6094	0.0441	0.89	0.83			
3511307	SR	0.42	0.32	1.5483	0.0433	1.16	1.26			
3488373	SR	0.67	0.42	0.0790	0.0473	1.02	1.03			
3511467	SR	0.83	0.39	-0.9093	0.0574	0.90	0.74			
100000043850	SR	0.64	0.47	0.2307	0.0465	0.97	0.95			
3511339	SR	0.67	0.51	0.4633	0.0441	0.92	0.91			
3512639	SR	0.80	0.35	-0.6094	0.0523	1.06	1.11			
100000043853	SR	0.67	0.40	0.3350	0.0448	1.03	1.08			
3512615	BCR	0.81	0.47	-0.6929	0.0534	0.86	0.84			
3595439	BCR	0.59	0.51	0.7258	0.0340	1.03	1.02	-1.4307	1.4307	
3511216	SR	0.70	0.26	0.2030	0.0454	1.17	1.18			
100000043855	SR	0.40	0.48	1.6760	0.0431	0.93	0.94			
3488377	SR	0.72	0.36	0.0327	0.0465	1.08	1.04			
3511542	SR	0.64	0.48	0.3252	0.0448	0.95	0.92			
3511336	BCR	0.43	0.53	1.5666	0.0435	0.90	0.84			
3595440	BCR	0.38	0.64	1.8347	0.0321	0.87	0.83	-0.9254	0.9254	
3492137	SR	0.79	0.40	-0.5120	0.0514	0.98	1.06			
3511246	SR	0.77	0.45	-0.3310	0.0496	0.96	0.84			
3511458	SR	0.91	0.35	-1.7042	0.0715	0.87	0.75			
3511479	SR	0.64	0.44	0.6218	0.0436	1.00	1.05			
3511504	SR	0.90	0.24	-1.2550	0.0618	0.99	1.35			
3488324	SR	0.75	0.50	-0.1710	0.0480	0.87	0.76			
3511513	SR	0.87	0.35	-1.1293	0.0596	0.88	0.93			
3512632	SR	0.42	0.39	1.6552	0.0431	1.04	1.15			
3511258	ECR	0.85	0.37	-1.0108	0.0581	1.00	0.89			
3595441	ECR	0.51	0.51	0.8865	0.0362	0.99	0.99	-4.0748	0.2841	3.7906
3511266	SR	0.70	0.43	0.0148	0.0467	1.04	0.97			

Table C.6 (continued)

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3488431	SR	0.75	0.26	-0.2189	0.0484	1.17	1.44			
3511470	SR	0.87	0.37	-0.6898	0.0533	0.78	0.67			
3511499	SR	0.63	0.52	0.1746	0.0457	1.00	1.00			
3511330	SR	0.63	0.29	0.6342	0.0437	1.17	1.22			
3556476	BCR	0.51	0.50	1.0842	0.0428	0.93	0.91			
3595442	BCR	0.45	0.61	1.3952	0.0275	0.96	0.92	0.5900	-0.5900	
3511348	SR	0.56	0.38	0.8588	0.0432	1.10	1.19			
3512595	SR	0.80	0.36	-0.6828	0.0533	1.06	1.19			
3511521	SR	0.64	0.53	0.2895	0.0452	0.95	0.91			
3488418	SR	0.44	0.33	1.4472	0.0431	1.11	1.19			
3488372	SR	0.85	0.38	-1.1720	0.0608	0.94	0.86			
3511376	SR	0.89	0.34	-0.9892	0.0574	0.77	0.92			
3511396	SR	0.89	0.35	-1.1516	0.0600	0.83	0.73			
3511429	SR	0.78	0.44	-0.5025	0.0512	1.00	0.99			
3512618	BCR	0.48	0.57	1.3102	0.0430	0.88	0.84			
3595443	BCR	0.55	0.45	0.5023	0.0461	0.96	0.94	-2.7505	2.7505	
3488455	SR	0.93	0.31	-1.9347	0.0771	0.94	0.95			
3488299	SR	0.63	0.40	0.4209	0.0450	1.04	1.01			
3488457	SR	0.48	0.51	1.2508	0.0435	0.90	0.90			
3512628	SR	0.83	0.30	-0.5862	0.0520	0.99	1.16			
3511439	SR	0.79	0.47	-0.5779	0.0520	0.98	0.96			
3512564	BCR	0.35	0.42	2.0012	0.0443	0.98	0.97			
3595444	BCR	0.30	0.47	2.6476	0.0367	1.04	1.05	-1.6217	1.6217	
3511442	SR	0.62	0.47	0.5383	0.0439	0.96	0.94			
3512644	BCR	0.38	0.59	1.8003	0.0439	0.81	0.73			
3595445	BCR	0.48	0.64	1.2216	0.0316	0.87	0.86	-0.9532	0.9532	
100000043851	SR	0.65	0.50	0.4326	0.0444	0.92	0.85			
3511448	SR	0.79	0.37	-0.6839	0.0534	1.10	1.16			

Table C.7 The 2008 MSA-Mathematics Classical and Rasch Item Parameters: Grade 6 Form A

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3516257	SR	0.88	0.30	-1.2053	0.0545	0.91	1.18			
3488264	SR	0.69	0.53	-0.0691	0.0448	0.89	0.77			
3516291	SR	0.55	0.33	0.6406	0.0427	1.26	1.38			
3492143	SR	0.78	0.45	-0.6658	0.0487	0.97	0.88			
3516295	SR	0.71	0.33	0.1004	0.0440	1.11	1.19			
3516243	SR	0.73	0.42	-0.2844	0.0459	1.01	0.94			
3517004	ECR	0.90	0.36	-1.7891	0.0642	0.92	0.77			
3595446	ECR	0.62	0.60	0.1623	0.0274	1.11	1.14	-1.8832	0.1382	1.7450
3516248	SR	0.84	0.40	-1.2219	0.0548	0.96	0.89			
3516559	SR	0.92	0.29	-1.4432	0.0579	0.74	0.84			
3516255	SR	0.79	0.31	-0.4703	0.0472	1.04	1.14			
3516258	SR	0.63	0.37	0.3254	0.0434	1.15	1.23			
3516298	SR	0.38	0.53	1.7544	0.0444	0.89	0.92			
3516240	SR	0.65	0.54	0.2409	0.0437	0.88	0.83			
3516909	SR	0.60	0.48	0.4042	0.0433	0.99	0.96			
3516283	SR	0.50	0.50	0.9203	0.0427	0.97	0.98			
3516627	BCR	0.50	0.53	0.8724	0.0436	0.98	0.95			
3595447	BCR	0.42	0.58	1.4503	0.0358	0.95	0.94	-1.6293	1.6293	
3488482	SR	0.86	0.42	-1.3990	0.0577	0.90	0.75			
3516285	SR	0.58	0.43	0.3104	0.0438	1.13	1.16			
3516290	SR	0.76	0.45	-0.1396	0.0459	0.86	0.83			
100000043862	SR	0.63	0.45	0.2101	0.0442	1.04	1.03			
3488383	SR	0.69	0.26	-0.1255	0.0455	1.25	1.54			
3488516	SR	0.70	0.26	-0.1462	0.0451	1.26	1.57			
100000043865	SR	0.54	0.43	0.7262	0.0427	1.08	1.11			
3516363	BCR	0.50	0.64	0.9993	0.0429	0.77	0.69			
3595448	BCR	0.62	0.68	0.2927	0.0310	0.81	0.76	-0.7056	0.7056	
3516453	SR	0.79	0.52	-0.8160	0.0501	0.93	0.84			
3516331	SR	0.50	0.37	1.1378	0.0428	1.14	1.17			
3516241	SR	0.86	0.40	-1.4702	0.0584	1.03	0.92			
3516247	SR	0.62	0.61	0.3674	0.0432	0.82	0.78			
3516329	SR	0.61	0.46	0.5144	0.0429	0.98	1.00			
3516355	SR	0.72	0.49	-0.1849	0.0454	0.93	0.84			
3516351	SR	0.53	0.51	0.4777	0.0430	0.99	0.97			
3492095	SR	0.81	0.51	-0.9261	0.0512	0.84	0.63			
3516249	SR	0.68	0.43	-0.4091	0.0467	1.17	1.39			

Table C.7 (continued)

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3516333	BCR	0.65	0.66	0.1802	0.0438	0.74	0.63			
3595449	BCR	0.61	0.69	0.3670	0.0313	0.80	0.80	-0.8656	0.8656	
3516573	SR	0.76	0.43	-0.3209	0.0462	0.91	0.91			
3516929	SR	0.67	0.48	0.0810	0.0442	1.02	0.95			
3516242	SR	0.49	0.39	1.2969	0.0432	1.12	1.24			
3516281	SR	0.52	0.52	0.8563	0.0426	1.01	1.05			
3516354	SR	0.71	0.52	-0.1945	0.0455	0.91	0.80			
3516906	SR	0.62	0.46	0.2864	0.0436	1.02	0.99			
3516332	SR	0.52	0.27	0.5885	0.0428	1.27	1.44			
3516256	SR	0.63	0.40	0.1350	0.0440	1.13	1.26			
3516302	SR	0.71	0.38	-0.4092	0.0468	1.16	1.25			
3492142	SR	0.65	0.38	0.1475	0.0440	1.14	1.12			
3517013	BCR	0.61	0.54	0.4029	0.0435	0.90	0.86			
3595450	BCR	0.73	0.60	-0.6751	0.0366	0.85	0.83	-1.4158	1.4158	
3516375	SR	0.63	0.50	0.2607	0.0435	0.95	0.89			
3517000	SR	0.60	0.44	0.6588	0.0428	1.03	1.02			
3516616	BCR	0.44	0.55	1.2017	0.0438	0.88	0.82			
3595451	BCR	0.52	0.47	0.6973	0.0385	1.06	1.07	-2.0205	2.0205	
3516613	SR	0.56	0.26	0.4071	0.0438	1.36	1.47			
3516313	SR	0.80	0.32	-1.3362	0.0572	1.16	1.42			
3516318	SR	0.88	0.43	-1.8302	0.0648	1.14	0.96			
3488508	SR	0.73	0.39	-0.3096	0.0461	1.08	1.09			
3516913	BCR	0.43	0.54	1.3284	0.0432	0.87	0.83			
3595452	BCR	0.57	0.67	0.4845	0.0340	0.79	0.79	-1.4754	1.4754	
3516323	SR	0.71	0.40	-0.0894	0.0449	1.03	1.02			
3516303	SR	0.56	0.49	0.6580	0.0428	0.98	0.96			

Table C.8 The 2008 MSA-Mathematics Classical and Rasch Item Parameters: Grade 6 Form F

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
100000043879	SR	0.85	0.32	-1.1606	0.0557	1.05	1.23			
3488502	SR	0.92	0.27	-2.1067	0.0740	1.02	1.11			
3516291	SR	0.56	0.32	0.6406	0.0431	1.23	1.37			
3516625	SR	0.93	0.38	-1.9630	0.0706	0.89	0.54			
3516295	SR	0.71	0.29	0.1004	0.0447	1.16	1.29			
3516243	SR	0.76	0.39	-0.2844	0.0469	1.06	1.02			
3516923	ECR	0.80	0.52	-0.6537	0.0501	0.88	0.73			
3595453	ECR	0.53	0.63	0.8626	0.0267	1.06	1.06	-1.8458	0.2499	1.5959
3516248	SR	0.87	0.36	-1.3853	0.0590	0.98	0.93			
3516559	SR	0.93	0.26	-1.4432	0.0601	0.72	0.74			
3516255	SR	0.79	0.32	-0.4703	0.0483	1.07	1.12			
3516361	SR	0.72	0.47	-0.1306	0.0460	0.98	0.95			
3492088	SR	0.89	0.42	-1.4997	0.0611	0.89	0.74			
3516240	SR	0.68	0.52	0.2409	0.0443	0.89	0.85			
3516909	SR	0.63	0.47	0.3274	0.0441	1.00	0.94			
3516283	SR	0.53	0.53	0.9203	0.0429	0.93	0.94			
3516627	BCR	0.57	0.50	0.6439	0.0440	1.00	0.97			
3595447	BCR	0.48	0.55	1.1168	0.0366	0.98	0.98	-1.7979	1.7979	
3488441	SR	0.58	0.63	0.6093	0.0435	0.79	0.70			
3516285	SR	0.61	0.42	0.3104	0.0444	1.10	1.13			
3516290	SR	0.77	0.44	-0.1396	0.0470	0.87	0.85			
100000043862	SR	0.66	0.45	0.0847	0.0455	1.03	0.95			
3488263	SR	0.80	0.43	-0.7946	0.0521	0.98	0.89			
3488500	SR	0.91	0.31	-1.7078	0.0649	0.98	1.04			
100000043865	SR	0.54	0.44	0.8249	0.0429	1.05	1.05			
3516628	BCR	0.25	0.50	2.5157	0.0481	0.82	0.70			
3595454	BCR	0.45	0.68	1.3822	0.0316	0.78	0.76	-1.0038	1.0038	
3516453	SR	0.87	0.48	-0.8160	0.0515	0.69	0.52			
3516331	SR	0.52	0.35	1.1378	0.0428	1.15	1.21			
3516241	SR	0.87	0.37	-1.4702	0.0607	1.11	0.99			
3516247	SR	0.65	0.60	0.3674	0.0437	0.79	0.73			
3516329	SR	0.67	0.41	0.5144	0.0434	1.03	1.00			
3516355	SR	0.74	0.48	-0.1849	0.0463	0.92	0.90			
3516351	SR	0.57	0.51	0.4777	0.0434	0.98	0.93			
3516565	SR	0.56	0.56	0.8786	0.0428	0.90	0.90			
3516249	SR	0.72	0.39	-0.4091	0.0479	1.13	1.34			

Table C.8 (continued)

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3516333	BCR	0.68	0.65	0.1568	0.0446	0.75	0.64			
3595449	BCR	0.63	0.68	0.3681	0.0317	0.79	0.79	-0.8854	0.8854	
3516573	SR	0.80	0.38	-0.3209	0.0472	0.91	0.91			
3516929	SR	0.75	0.50	-0.2890	0.0471	0.93	0.80			
3516242	SR	0.50	0.37	1.2969	0.0431	1.16	1.23			
100000043863	SR	0.70	0.42	-0.0212	0.0454	1.02	0.95			
3516354	SR	0.71	0.52	0.0038	0.0454	0.94	0.84			
3516906	SR	0.64	0.46	0.3667	0.0440	1.03	1.01			
3516332	SR	0.54	0.27	0.5885	0.0432	1.32	1.49			
3516256	SR	0.65	0.37	0.1350	0.0447	1.17	1.25			
3516302	SR	0.72	0.39	-0.4092	0.0479	1.19	1.26			
3488256	SR	0.64	0.55	0.3246	0.0440	0.91	0.84			
3517013	BCR	0.61	0.55	0.5063	0.0436	0.90	0.87			
3595450	BCR	0.74	0.58	-0.7280	0.0380	0.90	0.89	-1.6251	1.6251	
3516375	SR	0.65	0.53	0.2299	0.0442	0.91	0.84			
3517000	SR	0.59	0.44	0.6588	0.0432	1.04	1.04			
3516616	BCR	0.44	0.57	1.3552	0.0441	0.85	0.80			
3595451	BCR	0.52	0.45	0.7537	0.0392	1.10	1.11	-2.0793	2.0793	
3516613	SR	0.54	0.28	0.4071	0.0443	1.34	1.47			
3516313	SR	0.82	0.26	-1.3362	0.0592	1.19	1.80			
3516318	SR	0.90	0.35	-1.8302	0.0674	1.09	1.08			
3488508	SR	0.76	0.39	-0.3522	0.0474	1.02	1.15			
3516327	BCR	0.48	0.26	1.1725	0.0429	1.32	1.47			
3595455	BCR	0.64	0.58	0.2939	0.0318	1.00	0.97	-0.8570	0.8570	
3488257	SR	0.76	0.43	-0.4530	0.0483	0.99	0.95			
3516303	SR	0.59	0.47	0.6580	0.0432	0.99	0.99			

Table C.9 The 2008 MSA-Mathematics Classical and Rasch Item Parameters: Grade 7 Form A

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3517604	SR	0.35	0.43	1.0539	0.0441	1.01	1.02			
3517601	SR	0.53	0.54	0.4455	0.0432	0.94	0.94			
3517609	SR	0.60	0.51	0.1508	0.0433	0.95	0.94			
3517613	SR	0.72	0.56	-0.6420	0.0459	0.80	0.70			
100000043334	BCR	0.48	0.61	0.5824	0.0443	0.82	0.75			
3595363	BCR	0.61	0.64	-0.1895	0.0320	0.86	0.80	-0.6819	0.6819	
3517616	SR	0.66	0.50	-0.1398	0.0439	0.92	0.88			
3517634	SR	0.69	0.56	-0.4706	0.0450	0.85	0.78			
3517642	SR	0.50	0.59	0.3982	0.0431	0.89	0.85			
3517638	SR	0.80	0.49	-1.1551	0.0497	0.83	0.71			
3487667	SR	0.25	0.20	2.0203	0.0498	1.30	2.25			
3517650	SR	0.68	0.50	-0.4683	0.0450	0.94	0.95			
3517863	SR	0.66	0.32	-0.4038	0.0447	1.21	1.44			
3517652	SR	0.71	0.45	-0.6359	0.0459	1.01	0.92			
3547473	SR	0.84	0.39	-1.1243	0.0494	0.83	0.76			
3517663	SR	0.35	0.43	1.5825	0.0466	1.12	1.22			
100000043348	ECR	0.41	0.44	0.9563	0.0448	1.06	1.06			
3595364	ECR	0.30	0.57	1.5655	0.0276	1.21	1.20	-1.0967	0.3318	0.7649
100000043345	SPR	0.37	0.50	1.1777	0.0457	0.99	0.97			
3547779	SPR	0.58	0.50	0.0174	0.0442	0.99	1.03			
3517645	SPR	0.74	0.46	-1.0518	0.0498	0.99	0.98			
100000043351	SPR	0.75	0.50	-1.1112	0.0506	0.87	0.85			
3517665	SR	0.38	0.43	0.9745	0.0451	1.05	1.15			
3517646	BCR	0.74	0.45	-1.0888	0.0509	0.92	0.91			
3595365	BCR	0.73	0.41	-0.9755	0.0342	1.14	1.57	0.1389	-0.1389	
3517667	SR	0.56	0.46	-0.5147	0.0466	1.15	1.33			
3517678	SR	0.93	0.31	-2.6820	0.0748	0.85	0.72			
3517742	SR	0.61	0.47	0.0227	0.0435	0.98	1.00			
3547642	SPR	0.73	0.35	-0.9166	0.0481	1.06	1.36			
3487560	SPR	0.29	0.60	1.7398	0.0486	0.78	0.65			
3517725	BCR	0.33	0.58	1.5045	0.0461	0.84	0.76			
3564022	BCR	0.49	0.65	0.5585	0.0298	0.96	0.92	-0.4548	0.4548	
3517710	SR	0.72	0.52	-0.6119	0.0457	0.85	0.74			
3517656	SR	0.67	0.40	-0.4094	0.0448	1.11	1.05			
100000057641	SR	0.52	0.36	0.6653	0.0433	1.21	1.33			
100000043347	ECR	0.74	0.55	-0.8969	0.0476	0.83	0.72			

Table C.9 (continued)

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3595366	ECR	0.32	0.52	2.6970	0.0429	0.94	0.93	-4.3825	0.7102	3.6723
3517876	SPR	0.15	0.40	2.8645	0.0598	0.96	1.02			
100000043353	SPR	0.67	0.41	-0.4017	0.0450	1.12	1.25			
3547535	SR	0.85	0.41	-1.6395	0.0551	0.91	0.73			
100000043338	SR	0.34	0.28	1.4392	0.0459	1.23	1.68			
3517687	SR	0.58	0.48	-0.0583	0.0436	1.00	0.96			
3517692	SR	0.85	0.33	-1.4991	0.0532	0.91	0.92			
3517673	ECR	0.70	0.33	-0.6673	0.0461	1.13	1.45			
3564020	ECR	0.47	0.42	0.2954	0.0377	1.22	1.26	-4.5319	1.1166	3.4153
3487649	SPR	0.23	0.42	2.2096	0.0521	0.97	1.28			
3517654	SPR	0.56	0.36	0.1125	0.0435	1.18	1.35			
100000043343	SPR	0.55	0.58	0.2698	0.0433	0.88	0.86			
3517712	SR	0.47	0.35	0.5663	0.0438	1.18	1.35			
3517714	SR	0.58	0.59	0.0092	0.0441	0.84	0.77			
3517716	SR	0.70	0.34	-0.4333	0.0449	1.16	1.15			
3517718	SR	0.71	0.39	-0.2963	0.0443	1.01	1.02			
3517878	BCR	0.43	0.52	0.8699	0.0440	0.97	0.92			
3595367	BCR	0.55	0.64	0.1013	0.0346	0.88	0.87	-1.4432	1.4432	
3517721	SR	0.55	0.46	0.5231	0.0431	1.04	1.05			
3517691	SR	0.65	0.58	-0.2784	0.0443	0.84	0.80			
3517709	SR	0.70	0.50	-0.7302	0.0464	0.97	0.90			
3555858	SR	0.46	0.44	0.6673	0.0435	1.05	1.15			
3492156	SPR	0.37	0.59	1.2944	0.0455	0.83	0.73			
3555859	SR	0.76	0.42	-1.4603	0.0527	1.24	1.39			
3517752	SR	0.67	0.51	-0.5723	0.0456	0.99	0.93			
3488830	SR	0.61	0.58	-0.0385	0.0436	0.89	0.82			

Table C.10 The 2008 MSA-Mathematics Classical and Rasch Item Parameters: Grade 7 Form F

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3517604	SR	0.37	0.42	1.0539	0.0442	1.01	1.02			
3517601	SR	0.54	0.54	0.4455	0.0435	0.95	0.95			
3517609	SR	0.62	0.51	0.1508	0.0438	0.99	0.96			
3517613	SR	0.74	0.56	-0.6420	0.0468	0.87	0.81			
100000043335	BCR	0.70	0.49	-0.4860	0.0459	0.95	1.00			
3595368	BCR	0.83	0.56	-1.3132	0.0363	0.87	0.88	-0.2339	0.2339	
3517616	SR	0.68	0.50	-0.1398	0.0445	0.94	0.92			
3517634	SR	0.70	0.57	-0.4706	0.0457	0.86	0.72			
3517642	SR	0.52	0.58	0.3982	0.0435	0.90	0.89			
3517638	SR	0.81	0.54	-1.1551	0.0503	0.80	0.66			
100000043349	SR	0.38	0.32	1.3415	0.0451	1.18	1.46			
3517650	SR	0.65	0.44	-0.4683	0.0458	1.14	1.48			
3517739	SR	0.87	0.36	-1.9183	0.0591	1.00	1.25			
3517652	SR	0.75	0.45	-0.6359	0.0467	0.93	0.82			
3547473	SR	0.85	0.41	-1.1243	0.0501	0.87	0.85			
3517663	SR	0.36	0.40	1.5825	0.0462	1.09	1.31			
3487765	ECR	0.46	0.59	0.8535	0.0439	0.85	0.81			
3595369	ECR	0.55	0.60	0.5148	0.0322	0.96	0.98	-2.3799	-0.9260	3.3059
100000043344	SPR	0.38	0.53	1.2419	0.0453	0.92	0.96			
3513631	SPR	0.58	0.50	0.1934	0.0445	1.00	0.98			
3487596	SPR	0.41	0.57	1.0476	0.0451	0.87	0.79			
100000043350	SPR	0.61	0.55	-0.0987	0.0456	0.92	0.86			
3517665	SR	0.39	0.40	0.9745	0.0451	1.11	1.31			
3517610	BCR	0.50	0.60	0.4313	0.0457	0.85	0.76			
3595370	BCR	0.56	0.57	0.0359	0.0332	1.08	1.18	-0.7781	0.7781	
3517667	SR	0.53	0.41	-0.5147	0.0475	1.35	1.89			
3517678	SR	0.94	0.31	-2.6820	0.0738	0.78	0.51			
3517742	SR	0.61	0.47	0.0227	0.0441	1.01	1.07			
3513630	SPR	0.70	0.41	-0.5989	0.0466	1.06	1.22			
100000043360	SPR	0.59	0.56	0.1275	0.0439	0.91	0.86			
100000048821	BCR	0.68	0.46	-0.4202	0.0457	1.05	1.04			
3595371	BCR	0.39	0.51	1.8783	0.0438	0.99	1.00	-2.7673	2.7673	
3517710	SR	0.78	0.53	-0.6119	0.0465	0.81	0.68			
3517656	SR	0.67	0.41	-0.4094	0.0455	1.15	1.07			
3491634	SR	0.29	0.19	1.7720	0.0471	1.36	2.23			
3547487	ECR	0.86	0.49	-1.7311	0.0568	0.84	0.77			

Table C.10 (continued)

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3564031	ECR	0.36	0.54	2.1381	0.0387	0.94	0.93	-4.0409	0.4064	3.6345
100000043354	SPR	0.43	0.56	1.0066	0.0443	0.91	0.83			
100000043356	SPR	0.81	0.46	-1.3785	0.0527	0.93	0.97			
3547535	SR	0.84	0.43	-1.6395	0.0555	1.03	0.85			
100000043338	SR	0.34	0.28	1.4309	0.0455	1.25	1.81			
3517687	SR	0.60	0.48	-0.0583	0.0442	1.00	0.95			
3517692	SR	0.83	0.33	-1.4991	0.0537	1.03	1.22			
3517648	ECR	0.70	0.37	-0.5360	0.0462	1.17	1.41			
3564027	ECR	0.67	0.62	-0.3195	0.0302	0.94	0.96	-0.8801	-1.5639	2.4440
3492169	SPR	0.41	0.50	1.1079	0.0450	0.99	1.02			
100000043342	SPR	0.70	0.48	-0.5518	0.0464	0.96	1.03			
3492165	SPR	0.50	0.58	0.5345	0.0444	0.86	0.78			
3487747	SR	0.24	0.44	2.1330	0.0502	0.95	0.98			
3517714	SR	0.62	0.57	0.0092	0.0447	0.86	0.77			
3517716	SR	0.70	0.35	-0.4333	0.0457	1.18	1.14			
3517718	SR	0.72	0.38	-0.2963	0.0450	1.05	1.09			
3517708	BCR	0.59	0.47	0.1843	0.0437	1.02	1.03			
3595372	BCR	0.82	0.56	-1.3958	0.0372	0.92	0.92	-0.7581	0.7581	
3517721	SR	0.56	0.46	0.5231	0.0435	1.05	1.09			
3517691	SR	0.70	0.58	-0.4072	0.0455	0.82	0.75			
3517709	SR	0.71	0.51	-0.7302	0.0472	0.98	1.04			
3487615	SR	0.62	0.60	0.0253	0.0442	0.84	0.76			
3487734	SPR	0.48	0.55	0.7117	0.0442	0.89	0.84			
3555859	SR	0.77	0.42	-1.4603	0.0534	1.20	1.26			
3517752	SR	0.68	0.52	-0.5723	0.0465	1.03	0.97			
3487898	SR	0.54	0.36	0.3744	0.0438	1.22	1.35			

Table C.11 The 2008 MSA-Mathematics Classical and Rasch Item Parameters: Grade 8 Form A

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3514015	SR	0.28	0.35	1.4965	0.0480	1.19	1.41			
3514014	SR	0.57	0.39	-0.2177	0.0426	1.13	1.13			
3514013	BCR	0.48	0.67	0.2481	0.0430	0.74	0.67			
3564107	BCR	0.66	0.64	-0.9490	0.0344	0.84	0.82	-1.2905	1.2905	
3514016	SR	0.79	0.34	-1.3613	0.0474	0.96	0.96			
3500150	SR	0.47	0.41	0.3158	0.0428	1.08	1.14			
3514053	SR	0.74	0.40	-1.2003	0.0463	0.95	0.98			
100000043330	SR	0.45	0.51	0.3621	0.0428	0.97	0.98			
100000043305	SR	0.64	0.32	-0.7079	0.0438	1.16	1.22			
3514702	ECR	0.32	0.51	1.0904	0.0458	0.94	0.89			
3564108	ECR	0.40	0.60	0.5369	0.0244	1.38	1.40	-0.8401	0.6976	0.1425
3513650	SPR	0.31	0.55	1.1148	0.0462	0.88	0.83			
3514064	SPR	0.22	0.58	1.6566	0.0499	0.78	0.62			
3500166	SPR	0.33	0.51	0.9813	0.0456	0.94	0.90			
100000043325	SPR	0.59	0.45	-0.4508	0.0438	0.99	1.10			
3514595	SR	0.69	0.35	-0.8540	0.0443	1.11	1.17			
3514059	SR	0.64	0.42	-0.5815	0.0434	1.02	0.98			
3514267	BCR	0.40	0.55	0.6788	0.0439	0.90	0.81			
3564110	BCR	0.67	0.60	-0.9812	0.0343	0.89	0.87	-1.2635	1.2635	
3514263	SPR	0.59	0.45	-0.3795	0.0431	1.00	1.05			
3487907	SPR	0.46	0.69	0.3647	0.0431	0.71	0.62			
100000043320	SR	0.47	0.35	0.2581	0.0428	1.17	1.23			
3514058	SR	0.33	0.47	1.0306	0.0451	0.96	1.03			
3514062	SR	0.43	0.58	0.5139	0.0432	0.88	0.88			
3514117	BCR	0.37	0.68	0.7094	0.0449	0.73	0.63			
3564111	BCR	0.41	0.68	0.5525	0.0318	0.87	0.84	-0.7657	0.7657	
3492059	SPR	0.45	0.56	0.3553	0.0435	0.87	0.84			
3487708	SPR	0.70	0.53	-1.0683	0.0465	0.83	0.83			
3514291	SR	0.76	0.38	-1.4001	0.0478	1.00	1.18			
3514607	ECR	0.27	0.66	1.3428	0.0484	0.71	0.56			
3564112	ECR	0.28	0.72	1.1814	0.0262	0.87	0.76	0.0189	-0.8420	0.8231
100000043323	SR	0.50	0.53	0.5661	0.0434	1.03	1.06			
3514057	SR	0.68	0.59	-0.9380	0.0448	0.82	0.69			
3514121	SR	0.72	0.37	-1.0563	0.0456	1.00	1.13			
3514118	BCR	0.10	0.31	2.9690	0.0672	1.03	0.94			
3564113	BCR	0.36	0.50	1.6151	0.0412	0.92	0.93	-2.4991	2.4991	

Table C.11 (continued)

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3514055	SR	0.56	0.42	-0.2581	0.0427	1.06	1.13			
3514052	SR	0.53	0.34	-0.1085	0.0426	1.17	1.16			
3487539	SR	0.64	0.36	-0.6178	0.0437	1.13	1.17			
100000043311	SR	0.36	0.16	0.8435	0.0444	1.42	1.70			
3487525	SR	0.50	0.58	0.0551	0.0427	0.87	0.83			
3487540	SR	0.65	0.39	-0.7102	0.0437	1.11	1.06			
3514074	SR	0.42	0.29	0.3257	0.0431	1.21	1.29			
3514075	SR	0.65	0.39	-0.6275	0.0435	1.11	1.02			
100000043313	ECR	0.60	0.52	-0.5034	0.0437	0.91	0.96			
3595405	ECR	0.72	0.61	-1.1346	0.0260	0.93	1.15	-0.8613	0.1993	0.6621
3513638	SPR	0.37	0.45	0.8139	0.0444	1.05	1.09			
3487542	SPR	0.50	0.57	0.0986	0.0432	0.84	0.79			
3514092	SR	0.44	0.35	0.2379	0.0427	1.16	1.23			
3514136	SR	0.67	0.43	-0.8910	0.0447	0.95	1.05			
3514095	SR	0.32	0.46	1.2102	0.0460	0.97	1.03			
3487568	SR	0.19	0.11	2.0087	0.0526	1.46	2.20			
100000043309	SR	0.18	0.31	1.8701	0.0512	1.05	1.32			
3514103	SR	0.68	0.36	-0.5330	0.0432	1.06	1.02			
100000043304	SR	0.27	0.43	1.3321	0.0471	0.98	1.19			
3500162	SPR	0.24	0.35	1.5218	0.0492	1.09	1.20			
3514079	SPR	0.29	0.55	1.2839	0.0474	0.86	0.82			
3514669	BCR	0.56	0.54	-0.2550	0.0436	0.88	0.89			
3564114	BCR	0.73	0.55	-1.2583	0.0336	0.89	0.89	-0.4250	0.4250	
3487912	SR	0.52	0.50	-0.0934	0.0429	0.95	0.92			
3514710	SR	0.53	0.38	-0.1424	0.0429	1.14	1.19			
3514139	SR	0.68	0.39	-1.3743	0.0481	1.17	1.46			

Table C.12 The 2008 MSA-Mathematics Classical and Rasch Item Parameters: Grade 8 Form F

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3514015	SR	0.28	0.32	1.4965	0.0475	1.21	1.39			
3514014	SR	0.58	0.39	-0.2177	0.0426	1.13	1.14			
3514013	BCR	0.50	0.65	0.1635	0.0429	0.76	0.69			
3564107	BCR	0.67	0.62	-1.0320	0.0354	0.84	0.83	-1.3764	1.3764	
3514016	SR	0.80	0.34	-1.3613	0.0480	0.96	1.03			
3487526	SR	0.60	0.52	-0.3818	0.0430	0.92	0.85			
3514053	SR	0.77	0.36	-1.2003	0.0468	1.02	1.19			
100000043330	SR	0.48	0.50	0.4265	0.0428	0.98	1.00			
100000043305	SR	0.64	0.32	-0.6357	0.0437	1.15	1.16			
3514283	ECR	0.41	0.60	0.7105	0.0438	0.82	0.72			
3564116	ECR	0.57	0.65	-0.5004	0.0272	1.02	0.99	-2.4388	1.4114	1.0274
3492049	SPR	0.60	0.41	-0.3910	0.0436	1.07	1.20			
100000043307	SPR	0.29	0.55	1.4660	0.0481	0.90	0.78			
3514162	SPR	0.44	0.58	0.6185	0.0440	0.90	0.85			
3487563	SPR	0.46	0.48	0.4457	0.0432	1.07	1.06			
3514595	SR	0.71	0.36	-0.9382	0.0450	1.12	1.35			
3514059	SR	0.68	0.43	-0.5815	0.0436	0.99	0.96			
3514217	BCR	0.30	0.41	1.5261	0.0479	1.09	1.07			
3595406	BCR	0.44	0.49	0.9485	0.0476	0.89	0.86	-2.9439	2.9439	
3513648	SPR	0.58	0.41	-0.2496	0.0429	1.03	1.07			
100000043314	SPR	0.29	0.54	1.3827	0.0472	0.89	0.82			
3500154	SR	0.74	0.48	-1.1600	0.0465	0.89	0.82			
3514058	SR	0.35	0.47	1.0306	0.0448	1.02	1.10			
3514062	SR	0.45	0.57	0.5139	0.0430	0.89	0.85			
3514117	BCR	0.38	0.66	0.8458	0.0450	0.75	0.64			
3564111	BCR	0.44	0.66	0.4167	0.0319	0.91	0.90	-0.8046	0.8046	
3514114	SPR	0.42	0.48	0.5733	0.0434	1.01	1.00			
3519804	SPR	0.27	0.59	1.5395	0.0484	0.80	0.63			
3514291	SR	0.78	0.35	-1.4001	0.0484	0.97	1.31			
3514607	ECR	0.28	0.66	1.4386	0.0484	0.72	0.59			
3564112	ECR	0.29	0.71	1.2339	0.0262	0.92	0.87	-0.1186	-0.6697	0.7883
100000043323	SR	0.51	0.51	0.5661	0.0432	1.04	1.08			
3514057	SR	0.69	0.56	-0.9380	0.0452	0.85	0.73			
3514121	SR	0.72	0.35	-1.0563	0.0461	1.04	1.25			
3514266	BCR	0.33	0.61	1.1230	0.0461	0.82	0.71			
3564120	BCR	0.51	0.62	0.0332	0.0339	0.92	0.92	-1.3167	1.3167	

Table C.12 (continued)

Item CID	Item Type	P-Value	Point-Biserial	Rasch Difficulty	*SE*	MS. Infit	MS. Outfit	Step 0-1	Step 1-2	Step 2-3
3514055	SR	0.59	0.41	-0.2581	0.0429	1.11	1.21			
3514052	SR	0.53	0.31	-0.1085	0.0428	1.23	1.25			
3487539	SR	0.64	0.35	-0.5920	0.0440	1.13	1.18			
3487901	SR	0.86	0.37	-2.1555	0.0579	0.93	0.92			
3514056	SR	0.78	0.31	-1.9767	0.0555	1.40	1.85			
3487540	SR	0.66	0.43	-0.6311	0.0437	1.02	0.99			
3514074	SR	0.46	0.35	0.3257	0.0428	1.18	1.30			
3514075	SR	0.66	0.38	-0.6275	0.0438	1.11	1.05			
100000043313	ECR	0.62	0.52	-0.4647	0.0436	0.93	0.97			
3595405	ECR	0.73	0.60	-1.1127	0.0264	1.00	1.17	-1.1482	0.3695	0.7787
3487913	SPR	0.37	0.46	0.9479	0.0445	1.05	1.08			
3514167	SPR	0.56	0.47	-0.2011	0.0432	0.99	0.93			
3514092	SR	0.44	0.36	0.2379	0.0426	1.20	1.29			
3514136	SR	0.70	0.46	-0.9134	0.0451	0.95	1.01			
3514095	SR	0.32	0.45	1.2102	0.0457	1.03	1.19			
3514174	SR	0.52	0.40	0.1391	0.0424	1.11	1.16			
3492047	SR	0.34	0.38	1.0119	0.0448	1.15	1.21			
3514103	SR	0.70	0.35	-0.5330	0.0433	1.05	1.10			
100000043304	SR	0.29	0.44	1.3763	0.0470	0.98	1.18			
3487721	SPR	0.50	0.57	0.1096	0.0433	0.89	0.85			
3492052	SPR	0.24	0.48	1.7004	0.0507	0.95	0.83			
3514709	BCR	0.52	0.53	0.0865	0.0432	0.94	0.96			
3595408	BCR	0.75	0.49	-1.3311	0.0347	0.98	1.02	-0.7377	0.7377	
3487672	SR	0.39	0.51	0.7592	0.0442	0.93	0.99			
3514710	SR	0.54	0.37	-0.1424	0.0431	1.16	1.26			
3514139	SR	0.70	0.38	-1.3743	0.0489	1.11	1.42			

APPENDIX D: THE 2008 MSA-MATH BLUEPRINTS

Table D.1 The 2008 MSA-Math Blueprint: Grade 3

Code	Standard / Objective statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
1	**1. Knowledge of Algebra, Patterns, or Functions - Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships**	***12 (5)***	***1 (1)***	***12 (4)***	***1***	***12 (2)***	***1 (1)***	***12 (1)***	***1 (1)***	***12 (3)***	***1 (1)***
1.A	**1.A. Patterns or Functions**										
1.A.1	**1.A.1. Identify, describe, extend, or create numeric patterns to:**										
1.A.1.a	1.A.1.a. Represent or analyze numeric patterns using skip counting by 2, 5, 10, or 100 starting with any whole number (0-1,000)										
1.A.1.b	1.A.1.b. Represent or analyze numeric patterns using skip counting by 3 or 4 starting with 0, 1, 2, 3, or 4 (0-30)										
1.A.1.c	1.A.1.c. Represent or analyze numeric patterns using skip counting backward by 10 or 100 starting with any whole number (0-1,000)										
1.A.2	**1.A.2. Identify, describe, extend or create non-numeric patterns to:**										
1.A.2.a	1.A.2.a. Represent or analyze growing patterns using symbols, shapes, designs, or pictures starting at the beginning and showing at least 3 levels but no more than 5 and asking for the next level										
1.A.2.b	1.A.2.b. Represent or analyze repeating patterns using symbols, shapes, designs, or pictures with no more than 4 objects in the core of the pattern										
1.B	**1.B. Expressions, Equations, or Inequalities**										
1.B.1	**1.B.1. Write or identify expressions to:**										
1.B.1.a	1.B.1.a. Represent numeric quantities with one operational symbol (+, -) using whole numbers (0-50)										
1.B.2	**1.B.2. Identify, write, or solve equations or inequalities to:**										
1.B.2.a	1.B.2.a. Represent relationships by using the appropriate relational symbols (>, <, =) and operational symbols (+, -) on either side using whole numbers (0-1,000)										

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
1	**1. Knowledge of Algebra, Patterns, or Functions - Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships**	***12*** ***(2)***	***1***	***12*** ***(1)***	***1***	***12*** ***(2)***	***1***	***12***	***1***	***12*** ***(1)***	***1***
1.A	**1.A. Patterns or Functions**										
1.A.1	**1.A.1. Identify, describe, extend, or create numeric patterns to:**										
1.A.1.a	1.A.1.a. Represent or analyze numeric patterns using skip counting by 2, 5, 10, or 100 starting with any whole number (0-1,000)										
1.A.1.b	1.A.1.b. Represent or analyze numeric patterns using skip counting by 3 or 4 starting with 0, 1, 2, 3, or 4 (0-30)										
1.A.1.c	1.A.1.c. Represent or analyze numeric patterns using skip counting backward by 10 or 100 starting with any whole number (0-1,000)										
1.A.2	**1.A.2. Identify, describe, extend or create non-numeric patterns to:**										
1.A.2.a	1.A.2.a. Represent or analyze growing patterns using symbols, shapes, designs, or pictures starting at the beginning and showing at least 3 levels but no more than 5 and asking for the next level										
1.A.2.b	1.A.2.b. Represent or analyze repeating patterns using symbols, shapes, designs, or pictures with no more than 4 objects in the core of the pattern										
1.B	**1.B. Expressions, Equations, or Inequalities**										
1.B.1	**1.B.1. Write or identify expressions to:**										
1.B.1.a	1.B.1.a. Represent numeric quantities with one operational symbol (+, -) using whole numbers (0-50)										
1.B.2	**1.B.2. Identify, write, or solve equations or inequalities to:**										
1.B.2.a	1.B.2.a. Represent relationships by using the appropriate relational symbols (>, <, =) and operational symbols (+, -) on either side using whole numbers (0-1,000)										

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
1.B.2.b	1.B.2.b. Find the missing number (unknown) in a number sentence (equation) with one operation (+, -) using whole numbers (0-100)										
1.C	**1.C. Numeric or Graphic Representations of Relationships**										
1.C.1	**1.C.1. Locate points on a number line to:**										
1.C.1.a	1.C.1.a. Represent whole numbers on a number line (0-500)										
1.C.1.b	1.C.1.b. Represent proper fractions with denominators of 2, 3, or 4 on a number line										
2	**2. Knowledge of Geometry - Students will apply the properties of one, two, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects**	***7*** ***(1)***	***1*** ***(1)***	***7*** ***(2)***	***1*** ***(1)***	***7*** ***(4)***	***1***	***7*** ***(1)***	***1***	***7*** ***(2)***	***1*** ***(1)***
2.A	**2.A. Plane Geometric Figures**										
2.A.1	**2.A.1. Analyze the properties of plane geometric figures to:**										
2.A.1.a	2.A.1.a. Identify or describe polygons including triangles, quadrilaterals, pentagons, hexagons, or octagons by the number of sides or vertices										
2.A.1.b	2.A.1.b. Identify or describe quadrilaterals (squares, rectangles, rhombi, parallelograms, trapezoids) by the length of sides										
2.A.1.c	2.A.1.c. Identify triangles, rectangles, or squares as part of a composite figure comprised of 2 of the stated polygons										
2.B	**2.B. Solid Geometric Figures**										
2.B.1	**2.B.1. Analyze the properties of solid geometric figures to:**										
2.B.1.a	2.B.1.a. Identify or describe a cube by the number of edges, faces, vertices, or shape of each face										
2.D	**2.D. Congruence or Similarity**										
2.D.1	**2.D.1 Analyze congruent figures to:**										
2.D.1.a	2.D.1.a. Identify or describe geometric figures with the same shape and same size										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
1.B.2.b	1.B.2.b. Find the missing number (unknown) in a number sentence (equation) with one operation (+, -) using whole numbers (0-100)										
1.C	**1.C. Numeric or Graphic Representations of Relationships**										
1.C.1	**1.C.1. Locate points on a number line to:**										
1.C.1.a	1.C.1.a. Represent whole numbers on a number line (0-500)										
1.C.1.b	1.C.1.b. Represent proper fractions with denominators of 2, 3, or 4 on a number line										
2	**2. Knowledge of Geometry - Students will apply the properties of one, two, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects**	***7*** ***(2)***	***1***	***7*** ***(2)***	***1***	***7*** ***(1)***	***1*** ***(1)***	***7*** ***(1)***	***1***	***7*** ***(3)***	***1***
2.A	**2.A. Plane Geometric Figures**										
2.A.1	**2.A.1. Analyze the properties of plane geometric figures to:**										
2.A.1.a	2.A.1.a. Identify or describe polygons including triangles, quadrilaterals, pentagons, hexagons, or octagons by the number of sides or vertices										
2.A.1.b	2.A.1.b. Identify or describe quadrilaterals (squares, rectangles, rhombi, parallelograms, trapezoids) by the length of sides										
2.A.1.c	2.A.1.c. Identify triangles, rectangles, or squares as part of a composite figure comprised of 2 of the stated polygons										
2.B	**2.B. Solid Geometric Figures**										
2.B.1	**2.B.1. Analyze the properties of solid geometric figures to:**										
2.B.1.a	2.B.1.a. Identify or describe a cube by the number of edges, faces, vertices, or shape of each face										
2.D	**2.D. Congruence or Similarity**										
2.D.1	**2.D.1 Analyze congruent figures to:**										
2.D.1.a	2.D.1.a. Identify or describe geometric figures with the same shape and same size										

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
2.E	**2.E. Transformations**										
2.E.1	**2.E.1. Analyze a transformation to:**										
2.E.1.a	2.E.1.a. Identify or describe the results of a slide (horizontal), flip (over a vertical line), or turn around a given point (90o clockwise) of a geometric figure or picture										
2.E.2	2.E.2. Analyze geometric figures or pictures to:										
2. E.2.a.	2.E.2.a. Identify or describe not more than 4 lines of symmetry										
3	**3. Knowledge of Measurement - Students will identify attributes, units, or systems of measurement or apply a variety of techniques, formulas, tools or technology for determining measurements.**	***6 (3)***	***1***	***6 (4)***	***1***	***6 (3)***	***1 (1)***	***6 (2)***	***1***	***6 (4)***	***1***
3.A	**3.A. Measurement Scales**										
3.A.1	**3.A.1. Read scales to:**										
3.A.1.a	3.A.1.a. Estimate or determine length to the nearest centimeter or 1/2 inch										
3.A.1.b	3.A.1.b. Identify time to the nearest minute using an analog clock										
3.A.1.c	3.A.1.c. Estimate or determine temperature to the nearest degree (˚F or ˚C)										
3.A.1.d	3.A.1.d. Estimate or determine weight to the nearest pound or ounce										
3.B	**3.B. Measurement Tools**										
3.B.1	**3.B.1. Use standard or metric units to:**										
3.B.1.a	3.B.1.a. Measure length to the nearest centimeter or ½ inch using a ruler										
3.C	**3.C. Applications in Measurement**										
3.C.1	**3.C.1. Apply measurement concepts to:**										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
2.E	**2.E. Transformations**										
2.E.1	**2.E.1. Analyze a transformation to:**										
2.E.1.a	2.E.1.a. Identify or describe the results of a slide (horizontal), flip (over a vertical line), or turn around a given point (90o clockwise) of a geometric figure or picture										
2.E.2	2.E.2. Analyze geometric figures or pictures to:										
2.E.2.a.	2.E.2.a. Identify or describe not more than 4 lines of symmetry										
3	**3. Knowledge of Measurement - Students will identify attributes, units, or systems of measurement or apply a variety of techniques, formulas, tools or technology for determining measurements.**	***6 (4)***	***1***	***6 (2)***	***1***	***6 (1)***	***1***	***6 (1)***	***1***	***6 (3)***	***1***
3.A	**3.A. Measurement Scales**										
3.A.1	**3.A.1. Read scales to:**										
3.A.1.a	3.A.1.a. Estimate or determine length to the nearest centimeter or 1/2 inch										
3.A.1.b	3.A.1.b. Identify time to the nearest minute using an analog clock										
3.A.1.c	3.A.1.c. Estimate or determine temperature to the nearest degree (˚F or ˚C)										
3.A.1.d	3.A.1.d. Estimate or determine weight to the nearest pound or ounce										
3.B	**3.B. Measurement Tools**										
3.B.1	**3.B.1. Use standard or metric units to:**										
3.B.1.a	3.B.1.a. Measure length to the nearest centimeter or ½ inch using a ruler										
3.C	**3.C. Applications in Measurement**										
3.C.1	**3.C.1. Apply measurement concepts to:**										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
3.C.1.a	3.C.1.a. Find the perimeter of geometric figure or pictures on a grid (0-50)										
3.C.1.b	3.C.1.b. Find the area of geometric figures or pictures on a grid using whole units (0-50)										
3.C.2	**3.C.2. Calculate to:**										
3.C.2.a	3.C.2.a. Determine equivalent units of 12 inches = 1 foot or 3 feet = 1 yard (0-30)										
4	**4. Knowledge of Statistics - Students will collect, organize, display, analyze, or interpret data to make decisions or predictions**	***11 (4)***	***1***	***11 (2)***	***1***	***11 (3)***	***1***	***11 (5)***	***1 (1)***	***11 (2)***	***1***
4.A	**4.A. Data Displays**										
4.A.1	**4.A.1. Organize or display data to:**										
4.A.1.a	4.A.1.a. Make tables with no more than 4 categories and 1 set of data using whole numbers (0-1,000)										
4.A.1.b	4.A.1.b. Make pictographs with scales of 2:1, 4:1, or 10:1 using whole numbers (0-100)										
4.A.1.c	4.A.1.c. Make single bar graphs with no more than 4 categories using intervals of 1, 2, 5, or 10 using whole numbers (0-100)										
4.B	**4.B. Data Analysis**										
4.B.1	**4.B.1. Analyze data to:**										
4.B.1.a	4.B.1.a. Interpret tables with no more than 4 categories and 1 set of data using whole numbers (0-1,000)										
4.B.1.b	4.B.1.b. Interpret pictographs with scales of 2:1, 4:1, or 10:1 using whole numbers (0-100)										
4.B.1.c	4.B.1.c. Interpret single bar graphs with maximum of 4 bars with intervals of 1, 2, 5, or 10 using whole numbers (0-100)										

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
3.C.1.a	3.C.1.a. Find the perimeter of geometric figure or pictures on a grid (0-50)										
3.C.1.b	3.C.1.b. Find the area of geometric figures or pictures on a grid using whole units (0-50)										
3.C.2	**3.C.2. Calculate to:**										
3.C.2.a	3.C.2.a. Determine equivalent units of 12 inches = 1 foot or 3 feet = 1 yard (0-30)										
4	**4. Knowledge of Statistics - Students will collect, organize, display, analyze, or interpret data to make decisions or predictions**	***11 (1)***	***1 (1)***	***11 (2)***	***1 (1)***	***11 (4)***	***1***	***11 (5)***	***1***	***11 (1)***	***1***
4.A	**4.A. Data Displays**										
4.A.1	**4.A.1. Organize or display data to:**										
4.A.1.a	4.A.1.a. Make tables with no more than 4 categories and 1 set of data using whole numbers (0-1,000)										
4.A.1.b	4.A.1.b. Make pictographs with scales of 2:1, 4:1, or 10:1 using whole numbers (0-100)										
4.A.1.c	4.A.1.c. Make single bar graphs with no more than 4 categories using intervals of 1, 2, 5, or 10 using whole numbers (0-100)										
4.B	**4.B. Data Analysis**										
4.B.1	**4.B.1. Analyze data to:**										
4.B.1.a	4.B.1.a. Interpret tables with no more than 4 categories and 1 set of data using whole numbers (0-1,000)										
4.B.1.b	4.B.1.b. Interpret pictographs with scales of 2:1, 4:1, or 10:1 using whole numbers (0-100)										
4.B.1.c	4.B.1.c. Interpret single bar graphs with maximum of 4 bars with intervals of 1, 2, 5, or 10 using whole numbers (0-100)										

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
5	**5. Knowledge of Probability - Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.**	***2***		***2***		***2***		***2*** ***(1)***		***2***	
5.B	**5.B. Theoretical Probability**										
5.B.1	**5.B.1. Determine the relative probability of one simple event to:**										
5.B.1.a	5.B.1.a Describe the probability using the terms more (or most) likely, less (or least) likely, or equally likely										
6	**6. Knowledge of Number Relationships or Computation - Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.**	***13***	***3***	***13*** ***(1)***	***3*** ***(1)***	***13*** ***(1)***	***3***	***13*** ***(3)***	***3***	***13*** ***(2)***	***3***
6.A	**6.A. Knowledge of Number or Place Value**										
6.A.1.	**6.A.1. Apply knowledge of rational numbers or place value to:**										
6.A.1.a	6.A.1.a. Read, write, or represent whole numbers using symbols, words, or models (0-10,000)										
6.A.1.b	6.A.1.b. Express whole numbers in expanded form (0-10,000)										
6.A.1.c	6.A.1.c. Identify the place value of a digit in a number (0-9,999)										
6.A.1.d	6.A.1.d. Compare, order, or describe no more than 4 whole numbers with or without using the symbols (<, >, =) (0-10,000)										
6.A.2	**6.A.2. Apply knowledge of fractions to:**										
6.A.2.a.	6.A.2.a. Read, write, or represent halves, thirds, or fourths of a single region using symbols, words, or models										
6.A.2.b	6.A.2.b. Read, write, or represent halves, thirds, or fourths of a set which has the same number of items as the denominator using symbols, words, or models										

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
5	**5. Knowledge of Probability - Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.**	***2 (1)***		***2 (1)***		***2***		***2***		***2 (1)***	
5.B	**5.B. Theoretical Probability**										
5.B.1	**5.B.1. Determine the relative probability of one simple event to:**										
5.B.1.a	5.B.1.a Describe the probability using the terms more (or most) likely, less (or least) likely, or equally likely										
6	**6. Knowledge of Number Relationships or Computation - Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.**	***13 (3)***	***3 (1)***	***13 (5)***	***3 (1)***	***13 (5)***	***3 (1)***	***13 (6)***	***3 (2)***	***13 (4)***	***3 (2)***
6.A	**6.A. Knowledge of Number or Place Value**										
6.A.1.	**6.A.1. Apply knowledge of rational numbers or place value to:**										
6.A.1.a	6.A.1.a. Read, write, or represent whole numbers using symbols, words, or models (0-10,000)										
6.A.1.b	6.A.1.b. Express whole numbers in expanded form (0-10,000)										
6.A.1.c	6.A.1.c. Identify the place value of a digit in a number (0-9,999)										
6.A.1.d	6.A.1.d. Compare, order, or describe no more than 4 whole numbers with or without using the symbols (<, >, =) (0-10,000)										
6.A.2	**6.A.2. Apply knowledge of fractions to:**										
6.A.2.a.	6.A.2.a. Read, write, or represent halves, thirds, or fourths of a single region using symbols, words, or models										
6.A.2.b	6.A.2.b. Read, write, or represent halves, thirds, or fourths of a set which has the same number of items as the denominator using symbols, words, or models										

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
6.A.3	**6.A.3. Apply knowledge of money to:**										
6.A.3.a	6.A.3.a. Represent money amounts ($0-$100)										
6.A.3.b	6.A.3.b. Determine the value of a given set of mixed currency up ($0-$100)										
6.B	**6.B. Number Theory**										
6.B.1	**6.B.1. Apply number relationships to:**										
6.B.1.a	6.B.1.a. Identify or describe whole numbers as even or odd (0-100)										
6.C	**6.C. Number Computation**										
6.C.1	**6.C.1. Analyze number relationships or compute to:**										
6.C.1.a	6.C.1.a. Add up to 3 addends with no more than 3 digits in each addend using whole numbers (0-1,000)										
6.C.1.b	6.C.1.b. Subtract a minuend and subtrahend with no more than 3 digits in each using whole numbers (0-999)										
6.C.1.c	6.C.1.c. Represent multiplication or division basic facts (up to 9 x 9 = 81) using number sentences, pictures or drawings										
6.C.1.d	6.C.1.d. Identify or use the commutative, identity or zero properties for multiplication using whole numbers (0-20)										

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
6.A.3	**6.A.3. Apply knowledge of money to:**										
6.A.3.a	6.A.3.a. Represent money amounts ($0-$100)										
6.A.3.b	6.A.3.b. Determine the value of a given set of mixed currency up ($0-$100)										
6.B	**6.B. Number Theory**										
6.B.1	**6.B.1. Apply number relationships to:**										
6.B.1.a	6.B.1.a. Identify or describe whole numbers as even or odd (0-100)										
6.C	**6.C. Number Computation**										
6.C.1	**6.C.1. Analyze number relationships or compute to:**										
6.C.1.a	6.C.1.a. Add up to 3 addends with no more than 3 digits in each addend using whole numbers (0-1,000)										
6.C.1.b	6.C.1.b. Subtract a minuend and subtrahend with no more than 3 digits in each using whole numbers (0-999)										
6.C.1.c	6.C.1.c. Represent multiplication or division basic facts (up to 9 x 9 = 81) using number sentences, pictures or drawings										
6.C.1.d	6.C.1.d. Identify or use the commutative, identity or zero properties for multiplication using whole numbers (0-20)										

Note. Number in parentheses indicates the total number of field test items.

Table D.2 The 2008 MSA-Math Blueprint: Grade 4

Code	Standard / Objective Statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
1	**1. Knowledge of Algebra, Patterns, or Functions - Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships.**	***13 (4)***	***1 (1)***	***13 (2)***	***1 (1)***	***13 (2)***	***1 (1)***	***13 (3)***	***1 (1)***	***13 (5)***	***1 (1)***
1.A	**1.A. Patterns or Functions**										
1.A.1	**1.A.1. Identify, describe, extend, or create numeric patterns or functions to:**										
1.A.1.a	1.A.1.a. Represent or analyze numeric patterns using skip counting by 3, 4, 6, 7, 8, or 9 starting with any whole number (0-100)										
1.A.1.b	1.A.1.b. Complete a function table using a rule with one operation (+, -, x, ÷ with no remainders) using whole numbers (0-50)										
1.A.2	1.A.2. Identify, describe, extend, analyze, or create a non-numeric growing or repeating pattern to:										
1.A.2.a	1.A.2.a. Generalize a rule for the next level of a non-numeric growing pattern given at least 3 levels but no more than 5 levels										
1.A.2.b	1.A.2.b. Generalize a rule for a repeating pattern with no more than 4 objects in the core pattern										
1.B	**1.B. Expressions, Equations, or Inequalities**										
1.B.1	**1.B.1. Write or identify expressions to:**										
1.B.1.a	1.B.1.a. Represent numeric quantities with one operational symbol (+, -, x, ÷ with no remainders) using whole numbers (0-100)										
1.B.1.b	1.B.1.b. Determine equivalent numeric expressions using whole number (0-100)										
1.B.2	**1.B.2. Identify, write, or solve equations or inequalities to:**										
1.B.2.a	1.B.2.a. Represent relationships by using the appropriate relational symbols (>, <, =) and operational symbols (+, -, x) on either side using whole numbers (0-200)										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
1	**1. Knowledge of Algebra, Patterns, or Functions - Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships.**	***13 (2)***	***1 (1)***	***13 (2)***	***1***	***13 (3)***	***1***	***13 (2)***	***1***	***13 (5)***	***1***
1.A	**1.A. Patterns or Functions**										
1.A.1	**1.A.1. Identify, describe, extend, or create numeric patterns or functions to:**										
1.A.1.a	1.A.1.a. Represent or analyze numeric patterns using skip counting by 3, 4, 6, 7, 8, or 9 starting with any whole number (0-100)										
1.A.1.b	1.A.1.b. Complete a function table using a rule with one operation (+, -, x, ÷ with no remainders) using whole numbers (0-50)										
1.A.2	**1.A.2. Identify, describe, extend, analyze, or create a non-numeric growing or repeating pattern to:**										
1.A.2.a	1.A.2.a. Generalize a rule for the next level of a non-numeric growing pattern given at least 3 levels but no more than 5 levels										
1.A.2.b	1.A.2.b. Generalize a rule for a repeating pattern with no more than 4 objects in the core pattern										
1.B	**1.B. Expressions, Equations, or Inequalities**										
1.B.1	**1.B.1. Write or identify expressions to:**										
1.B.1.a	1.B.1.a. Represent numeric quantities with one operational symbol (+, -, x, ÷ with no remainders) using whole numbers (0-100)										
1.B.1.b	1.B.1.b. Determine equivalent numeric expressions using whole number (0-100)										
1.B.2	**1.B.2. Identify, write, or solve equations or inequalities to:**										
1.B.2.a	1.B.2.a. Represent relationships by using the appropriate relational symbols (>, <, =) and operational symbols (+, -, x) on either side using whole numbers (0-200)										

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
1.B.2.b	1.B.2.b. Find the unknown in an equation with one operation (x) using whole numbers (0-100)										
1.C	**1.C. Numeric or Graphic Representations of Relationships**										
1.C.1	**1.C.1. Locate points on a number line or in a coordinate grid to:**										
1.C.1.a	1.C.1.a. Represent proper fractions with denominators of 6, 8, or 10 on a number line										
1.C.1.b	1.C.1.b. Identify positions on a coordinate plane in the first quadrant using ordered pairs of whole numbers (0-20)										
2	**2. Knowledge of Geometry - Students will apply the properties of one, two, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects**	***6 (1)***	***1***	***6 (2)***	***1***	***6 (2)***	***1***	***6***	***1***	***6 (2)***	***1 (1)***
2.A	**2.A. Plane Geometric Figures**										
2.A.1	**2.A.1. Analyze the properties of plane geometric figures to:**										
2.A.1.a	2.A.1.a. Identify or describe an angle as acute, right, or obtuse angle in relationship to another angle										
2.A.2	**2.A.2. Analyze geometric relationships to:**										
2.A.2.a	2.A.2.a. Compare or classify an angle as acute, right, or obtuse in relationship to another angle										
2.B	**2.B. Solid Geometric Figures**										
2.B.1	**2.B.1. Analyze the properties of solid geometric figures to:**										
2.B.1.a	2.B.1.a. Identify cones or cylinders										
2.B.1.b	2.B.1.b. Describe triangular pyramids, rectangular pyramids, triangular prisms, or rectangular prisms by the number of edges, faces, or vertices										
2.B.2	**2.B.2. Analyze the relationship between plane geometric figures and faces of solid geometric figures to:**										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
1.B.2.b	1.B.2.b. Find the unknown in an equation with one operation (x) using whole numbers (0-100)										
1.C	**1.C. Numeric or Graphic Representations of Relationships**										
1.C.1	**1.C.1. Locate points on a number line or in a coordinate grid to:**										
1.C.1.a	1.C.1.a. Represent proper fractions with denominators of 6, 8, or 10 on a number line										
1.C.1.b	1.C.1.b. Identify positions on a coordinate plane in the first quadrant using ordered pairs of whole numbers (0-20)										
2	**2. Knowledge of Geometry - Students will apply the properties of one, two, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects**	***6 (2)***	***1 (1)***	***6 (2)***	***1 (1)***	***6 (1)***	***1***	***6 (3)***	***1 (1)***	***6 (1)***	***1***
2.A	**2.A. Plane Geometric Figures**										
2.A.1	**2.A.1. Analyze the properties of plane geometric figures to:**										
2.A.1.a	2.A.1.a. Identify or describe an angle as acute, right, or obtuse angle in relationship to another angle										
2.A.2	**2.A.2. Analyze geometric relationships to:**										
2.A.2.a	2.A.2.a. Compare or classify an angle as acute, right, or obtuse in relationship to another angle										
2.B	**2.B. Solid Geometric Figures**										
2.B.1	**2.B.1. Analyze the properties of solid geometric figures to:**										
2.B.1.a	2.B.1.a. Identify cones or cylinders										
2.B.1.b	2.B.1.b. Describe triangular pyramids, rectangular pyramids, triangular prisms, or rectangular prisms by the number of edges, faces, or vertices										
2.B.2	**2.B.2. Analyze the relationship between plane geometric figures and faces of solid geometric figures to:**										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
2.B.2.a	2.B.2.a. Analyze or identify the number or arrangement of squares needed to make a cube										
2.B.2.b	2.B.2.b. Analyze or identify the number or arrangement of triangles/rectangles needed to make a triangular pyramid or rectangular pyramid										
2.D	**Congruence or Similarity**										
2.D.1	**2.D.1 Apply congruence in transformation to :**										
2.D.1.a	2.D.1.a Identify the result in a transformation as being congruent to the original figure										
2.E	**2.E. Transformations**										
2.E.1	**2.E.1. Analyze a transformation to:**										
2.E.1.a	2.E.1.a. Identify or describe the results of a translation (horizontal), reflection (over a vertical line), or rotation around a given point (90o clockwise) of a geometric figure or picture										
3	**3. Knowledge of Measurement - Students will identify attributes, units, or systems of measurement or apply a variety of techniques, formulas, tools or technology for determining measurements.**	***6*** ***(2)***	***1*** ***(1)***	***6*** ***(5)***	***1***	***6*** ***(4)***	***1*** ***(1)***	***6***	***1***	***6*** ***(1)***	***1***
3.A	**3.A. Measurement Scales**										
3.A.1	**3.A.1. Read scales to:**										
3.A.1.a	3.A.1.a. Estimate or determine length to the nearest millimeter or ¼ inch										
3.B	**3.B. Measurement Tools**										
3.B.1	**3.B.1. Use standard or metric units to:**										
3.B.1.a	3.B.1.a. Measure length to the nearest millimeter or 1/4 inch using a ruler										
3.C	**3.C. Applications in Measurement**										

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
2.B.2.a	2.B.2.a. Analyze or identify the number or arrangement of squares needed to make a cube										
2.B.2.b	2.B.2.b. Analyze or identify the number or arrangement of triangles/rectangles needed to make a triangular pyramid or rectangular pyramid										
2.D	**Congruence or Similarity**										
2.D.1	**2.D.1 Apply congruence in transformation to :**										
2.D.1.a	2.D.1.a Identify the result in a transformation as being congruent to the original figure										
2.E	**2.E. Transformations**										
2.E.1	**2.E.1. Analyze a transformation to:**										
2.E.1.a	2.E.1.a. Identify or describe the results of a translation (horizontal), reflection (over a vertical line), or rotation around a given point (90o clockwise) of a geometric figure or picture										
3	**3. Knowledge of Measurement - Students will identify attributes, units, or systems of measurement or apply a variety of techniques, formulas, tools or technology for determining measurements.**	***6*** ***(2)***	***1***	***6*** ***(2)***	***1***	***6*** ***(2)***	***1***	***6*** ***(2)***	***1***	***6*** ***(1)***	***1*** ***(1)***
3.A	**3.A. Measurement Scales**										
3.A.1	**3.A.1. Read scales to:**										
3.A.1.a	3.A.1.a. Estimate or determine length to the nearest millimeter or ¼ inch										
3.B	**3.B. Measurement Tools**										
3.B.1	**3.B.1. Use standard or metric units to:**										
3.B.1.a	3.B.1.a. Measure length to the nearest millimeter or 1/4 inch using a ruler										
3.C	**3.C. Applications in Measurement**										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
3.C.1	**3.C.1. Count or calculate to:**										
3.C.1.a	3.C.1.a. Find the perimeter of polygons with no more than 6 sides given the length of the sides in whole numbers (0-100)										
3.C.1.b	3.C.1.b. Find the area of rectangles given the length of the sides in whole numbers (0-100)										
3.C.1.c	3.C.1.c. Find elapsed or end time using hour and half hour intervals										
3.C.2	**3.C.2. Calculate to:**										
3.C.2.a	3.C.2.a. Determine equivalent units of 36 inches = 1 yard (0-100)										
4	**4. Knowledge of Statistics - Students will collect, organize, display, analyze, or interpret data to make decisions or predictions**	***7 (1)***	***1***	***7 (1)***	***1***	***7 (2)***	***1***	***7 (2)***	***1***	***7 (1)***	***1***
4.A	**4.A. Data Displays**										
4.A.1	**4.A.1. Organize or display data to:**										
4.A.1.a	4.A.1.a. Make line plots with no more than 20 pieces of unorganized data with a range of no more than 10 using whole numbers (0-100)										
4.B	**4.B. Data Analysis**										
4.B.1	**4.B.1. Analyze data to:**										
4.B.1.a	4.B.1.a. Interpret line plots with no more than 20 pieces of data with a range no more than 10 using whole numbers (0-100)										
4.B.1.b	4.B.1.b. Interpret line graphs with the x-axis representing no more than 6 time intervals, the y-axis consisting of no more than 10 intervals with scales as factors of 100 using whole numbers (0-100)										
4.B.2	**4.B.2. Analyze a data set to:**										
4.B.2.a	4.B.2.a. Find the range, median, or mode of a given data set with no more than 8 pieces of data using whole numbers (0-100)										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
3.C.1	**3.C.1. Count or calculate to:**										
3.C.1.a	3.C.1.a. Find the perimeter of polygons with no more than 6 sides given the length of the sides in whole numbers (0-100)										
3.C.1.b	3.C.1.b. Find the area of rectangles given the length of the sides in whole numbers (0-100)										
3.C.1.c	3.C.1.c. Find elapsed or end time using hour and half hour intervals										
3.C.2	**3.C.2. Calculate to:**										
3.C.2.a	3.C.2.a. Determine equivalent units of 36 inches = 1 yard (0-100)										
4	**4. Knowledge of Statistics - Students will collect, organize, display, analyze, or interpret data to make decisions or predictions**	***7*** ***(1)***	***1***	***7*** ***(2)***	***1***	***7*** ***(2)***	***1***	***7*** ***(2)***	***1***	***7*** ***(1)***	***1***
4.A	**4.A. Data Displays**										
4.A.1	**4.A.1. Organize or display data to:**										
4.A.1.a	4.A.1.a. Make line plots with no more than 20 pieces of unorganized data with a range of no more than 10 using whole numbers (0-100)										
4.B	**4.B. Data Analysis**										
4.B.1	**4.B.1. Analyze data to:**										
4.B.1.a	4.B.1.a. Interpret line plots with no more than 20 pieces of data with a range no more than 10 using whole numbers (0-100)										
4.B.1.b	4.B.1.b. Interpret line graphs with the x-axis representing no more than 6 time intervals, the y-axis consisting of no more than 10 intervals with scales as factors of 100 using whole numbers (0-100)										
4.B.2	**4.B.2. Analyze a data set to:**										
4.B.2.a	4.B.2.a. Find the range, median, or mode of a given data set with no more than 8 pieces of data using whole numbers (0-100)										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
5	**5. Knowledge of Probability - Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.**	***6***	***1***	***6***	***1***	***6***	***1***	***6***	***1***	***6***	***1***
						(1)		***(1)***			
5.B	**5.B. Theoretical Probability**										
5.B.1	**5.B.1. Determine the relative probability of one simple event comprised of equally likely outcomes to:**										
5.B.1.a	5.B.1.a Describe the probability as a fraction with a sample space of no more than 6 outcomes										
6	**6. Knowledge of Number Relationships or Computation - Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.**	***12***	***2***	***12***	***2***	***12***	***2***	***12***	***2***	***12***	***2***
		(5)		***(4)***	***(1)***	***(4)***		***(3)***	***(1)***	***(2)***	***(2)***
6.A	**6.A. Knowledge of Number or Place Value**										
6.A.1.	**6.A.1. Apply knowledge of whole numbers or place value to:**										
6.A.1.a	6.A.1.a. Read, write, or represent whole numbers using symbols, words, or models (0-1,000,000)										
6.A.1.b	6.A.1.b. Express whole numbers in expanded form (0-1,000,000)										
6.A.1.c	6.A.1.c. Identify the place value of a digit in a number (0-1,000,000)										
6.A.1.d	6.A.1.d. Compare or order no more than 4 whole numbers with or without using the symbols (<, >, =), (0-1,000,000)										
6.A.2	**6.A.2. Apply knowledge of fractions or decimals to:**										
6.A.2.a.	6.A.2.a. Read, write, or represent proper fractions in sixths, eights, tenths, of a single region using symbols, words, or models										
6.A.2.b	6.A.2.b. Read, write, or represent proper fractions in sixths, eights, tenths of a set which has the same number of items as the denominator using symbols, words, or models										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
5	**5. Knowledge of Probability - Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.**	***6*** ***(1)***	***1***	***6***	***1***	***6*** ***(1)***	***1***	***6***	***1***	***6*** ***(1)***	***1***
5.B	**5.B. Theoretical Probability**										
5.B.1	**5.B.1. Determine the relative probability of one simple event comprised of equally likely outcomes to:**										
5.B.1.a	5.B.1.a Describe the probability as a fraction with a sample space of no more than 6 outcomes										
6	**6. Knowledge of Number Relationships or Computation - Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.**	***12*** ***(5)***	***2***	***12*** ***(5)***	***2*** ***(1)***	***12*** ***(4)***	***2*** ***(2)***	***12*** ***(4)***	***2*** ***(1)***	***12*** ***(4)***	***2*** ***(1)***
6.A	**6.A. Knowledge of Number or Place Value**										
6.A.1.	**6.A.1. Apply knowledge of whole numbers or place value to:**										
6.A.1.a	6.A.1.a. Read, write, or represent whole numbers using symbols, words, or models (0-1,000,000)										
6.A.1.b	6.A.1.b. Express whole numbers in expanded form (0-1,000,000)										
6.A.1.c	6.A.1.c. Identify the place value of a digit in a number (0-1,000,000)										
6.A.1.d	6.A.1.d. Compare or order no more than 4 whole numbers with or without using the symbols (<, >, =), (0-1,000,000)										
6.A.2	**6.A.2. Apply knowledge of fractions or decimals to:**										
6.A.2.a.	6.A.2.a. Read, write, or represent proper fractions in sixths, eights, tenths, of a single region using symbols, words, or models										
6.A.2.b	6.A.2.b. Read, write, or represent proper fractions in sixths, eights, tenths of a set which has the same number of items as the denominator using symbols, words, or models										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
6.A.2.c	6.A.2.c. Read, write, or represent decimals with no more than 2 decimal places using symbols, words, or models (0-100)										
6.A.2.d	6.A.2.d. Express decimals with no more than 2 decimal places in expanded form (0-100)										
6.A.2.e	6.A.2.e. Compare or order no more than 3 fractions or mixed numbers with like denominators with or without using the symbols (<, >, =) (0-20)										
6.A.2.f	6.A.2.f. Compare, order, or describe no more than 3 decimals with no more than 2 decimals places with or without using symbols (<, >, =) (0-100)										
6.A.3	**6.A.3. Apply knowledge of money to:**										
6.A.3.a	6.A.3.a. Compare the value of 2 sets of mixed currency ($0-$100)										
6.B	**6.B. Number Theory**										
6.B.1	**6.B.1. Apply number relationships to:**										
6.B.1.a	6.B.1.a. Identify or use divisibility rules of 2, 5, or 10 with whole numbers (0-1,000)										
6.B.1.b	6.B.1.b. Identify the factors of whole numbers (0-24)										
6.B.1.c	6.B.1.c. Identify no more than the first 5 multiples of any single digit whole number										
6.C	**6.C. Number Computation**										
6.C.1	**6.C.1. Analyze number relationships or compute to:**										
6.C.1.a	6.C.1.a. Add up to 3 addends with no more than 4 digits in each addend using whole numbers (0-10,000)										
6.C.1.b	6.C.1.b. Subtract a minuend and subtrahend with no more than 4 digits in each using whole numbers (0-10,000)										
6.C.1.c	6.C.1.c. Multiply a one 1-digit factor by up to a 3-digit factor using whole numbers (0-1,000)										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
6.A.2.c	6.A.2.c. Read, write, or represent decimals with no more than 2 decimal places using symbols, words, or models (0-100)										
6.A.2.d	6.A.2.d. Express decimals with no more than 2 decimal places in expanded form (0-100)										
6.A.2.e	6.A.2.e. Compare or order no more than 3 fractions or mixed numbers with like denominators with or without using the symbols (<, >, =) (0-20)										
6.A.2.f	6.A.2.f. Compare, order, or describe no more than 3 decimals with no more than 2 decimals places with or without using symbols (<, >, =) (0-100)										
6.A.3	**6.A.3. Apply knowledge of money to:**										
6.A.3.a	6.A.3.a. Compare the value of 2 sets of mixed currency ($0-$100)										
6.B	**6.B. Number Theory**										
6.B.1	**6.B.1. Apply number relationships to:**										
6.B.1.a	6.B.1.a. Identify or use divisibility rules of 2, 5, or 10 with whole numbers (0-1,000)										
6.B.1.b	6.B.1.b. Identify the factors of whole numbers (0-24)										
6.B.1.c	6.B.1.c. Identify no more than the first 5 multiples of any single digit whole number										
6.C	**6.C. Number Computation**										
6.C.1	**6.C.1. Analyze number relationships or compute to:**										
6.C.1.a	6.C.1.a. Add up to 3 addends with no more than 4 digits in each addend using whole numbers (0-10,000)										
6.C.1.b	6.C.1.b. Subtract a minuend and subtrahend with no more than 4 digits in each using whole numbers (0-10,000)										
6.C.1.c	6.C.1.c. Multiply a one 1-digit factor by up to a 3-digit factor using whole numbers (0-1,000)										

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)		No. of Augmented Items (Form B)		No. of Augmented Items (Form C)		No. of Augmented Items (Form D)		No. of Augmented Items (Form E)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
6.C.1.d	6.C.1.d. Divide up to a 3-digit dividend by a 1-digit divisor using whole numbers and no remainders (0-1,000)										
6.C.1.e	6.C.1.e. Add or subtract 2 proper fractions with single digit like denominators, 2 mixed numbers with single digit like denominators or a whole number and a proper fraction with a single digit denominator (0-20)										
6.C.1.f	6.C.1.f. Add 2 decimals with the same number of decimal places but no more than 2 decimal places and no more than 4 digits including monetary notation (0-100)										
6.C.1.g	6.C.1.g. Subtract 2 decimals with the same number of decimal places but no more than 2 decimal places and no more than 4 digits including monetary notation (0-100)										
6.C.2	**6.C.2. Estimate to:**										
6.C.2.a	6.C.2.a. Determine the sum or difference of 2 numbers with no more than 2 decimal places in each (0-100)										
6.C.2.b	6.C.2.b. Determine the product of one 1-digit factor with the other factor having no more than 2 digits or the quotient of a 1-digit divisor with the dividend having no more than 2 digits using whole numbers (0-1,000)										

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)		No. of Augmented Items (Form G)		No. of Augmented Items (Form H)		No. of Augmented Items (Form J)		No. of Augmented Items (Form K)	
		SR	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*	*SR*	*BCR*
6.C.1.d	6.C.1.d. Divide up to a 3-digit dividend by a 1-digit divisor using whole numbers and no remainders (0-1,000)										
6.C.1.e	6.C.1.e. Add or subtract 2 proper fractions with single digit like denominators, 2 mixed numbers with single digit like denominators or a whole number and a proper fraction with a single digit denominator (0-20)										
6.C.1.f	6.C.1.f. Add 2 decimals with the same number of decimal places but no more than 2 decimal places and no more than 4 digits including monetary notation (0-100)										
6.C.1.g	6.C.1.g. Subtract 2 decimals with the same number of decimal places but no more than 2 decimal places and no more than 4 digits including monetary notation (0-100)										
6.C.2	**6.C.2. Estimate to:**										
6.C.2.a	6.C.2.a. Determine the sum or difference of 2 numbers with no more than 2 decimal places in each (0-100)										
6.C.2.b	6.C.2.b. Determine the product of one 1-digit factor with the other factor having no more than 2 digits or the quotient of a 1-digit divisor with the dividend having no more than 2 digits using whole numbers (0-1,000)										

Note. Number in parentheses indicates the total number of field test items.

Table D.3 The 2008 MSA-Math Blueprint: Grade 5

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
1.	**1. Knowledge of Algebra, Patterns, or Functions - Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships.**	***13*** ***(2)***	***1*** ***(1)***	***1*** ***(1)***	***13*** ***(3)***	***1***	***1*** ***(1)***	***13*** ***(4)***	***1***	***1*** ***(1)***	***13*** ***(2)***	***1***	***1*** ***(1)***	***13*** ***(4)***	***1***	***1*** ***(1)***
1.A	**1.A. Patterns or Functions**															
1.A.1	**1.A.1. Identify, describe, extend, or create numeric patterns or functions to:**															
1.A.1.a	1.A.1.a. Interpret or write the rule for a one operation (+, -, x, ÷ with no remainders) function table using whole numbers or decimals with no more than 2 decimal places (0-1,000)															
1.A.1.b	1.A.1.b. Complete a function table with a one operation (+, -, x, ÷ with no remainders) rule using whole numbers or decimals with no more than 2 decimal places (0-200)															
1.A.1.c	1.A.1.c. Apply a given two-operation rule (+, -, x) for a pattern using whole numbers (0-100)															
1.B	**1.B. Expressions, Equations, or Inequalities**															
1.B.1	**1.B.1. Write or evaluate expressions to:**															
1.B.1.a	1.B.1.a. Represent unknown quantities with one unknown and one operation (+, -, x, ÷ with no remainders) using whole numbers (0-100) or money ($0-$100)															
1.B.1.b	1.B.1.b. Determine the value of algebraic expressions with one unknown and one operation (+, -) using whole numbers (0-1,000)															
1.B.1.c	1.B.1.c. Determine the value of algebraic expressions with one unknown and one operation (x, ÷ with no remainders) that uses whole numbers and the number for the unknown is no more than 9 (0-100)															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
1.0	**1. Knowledge of Algebra, Patterns, or Functions - Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships.**	***13*** ***(3)***	***1***	***1*** ***(1)***	***13*** ***(3)***	***1***	***1*** ***(1)***	***13*** ***(2)***	***1***	***1*** ***(1)***	***13*** ***(2)***	***1*** ***(1)***	***1*** ***(1)***	***13*** ***(3)***	***1***	***1*** ***(1)***
1.A	**1.A. Patterns or Functions**															
1.A.1	**1.A.1. Identify, describe, extend, or create numeric patterns or functions to:**															
1.A.1.a	1.A.1.a. Interpret or write the rule for a one operation (+, -, x, ÷ with no remainders) function table using whole numbers or decimals with no more than 2 decimal places (0-1,000)															
1.A.1.b	1.A.1.b. Complete a function table with a one operation (+, -, x, ÷ with no remainders) rule using whole numbers or decimals with no more than 2 decimal places (0-200)															
1.A.1.c	1.A.1.c. Apply a given two-operation rule (+, -, x) for a pattern using whole numbers (0-100)															
1.B	**1.B. Expressions, Equations, or Inequalities**															
1.B.1	**1.B.1. Write or evaluate expressions to:**															
1.B.1.a	1.B.1.a. Represent unknown quantities with one unknown and one operation (+, -, x, ÷ with no remainders) using whole numbers (0-100) or money ($0-$100)															
1.B.1.b	1.B.1.b. Determine the value of algebraic expressions with one unknown and one operation (+, -) using whole numbers (0-1,000)															
1.B.1.c	1.B.1.c. Determine the value of algebraic expressions with one unknown and one operation (x, ÷ with no remainders) that uses whole numbers and the number for the unknown is no more than 9 (0-100)															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
1.B.2	**1.B.2. Identify, write, or solve equations or inequalities to:**															
1.B.2.a	1.B.2.a. Represent relationships by using the appropriate relational symbols (>, <, =) and one operational symbol (+, -, x, ÷ with no remainders) on either side using whole numbers (0-400)															
1.B.2.b	1.B.2.b. Find the unknown in an equation with one operation (+, -, x, ÷ with no remainders) using whole numbers (0-2,000)															
1.C	**1.C. Numeric or Graphic Representations of Relationships**															
1.C.1	**1.C.1. Locate points on a number line or in a coordinate grid to:**															
1.C.1.a	1.C.1.a. Represent decimals with no more than two decimal places (0-100) or mixed numbers (0-10) with denominators of 2, 3, 4, 5, 6, 8, or 10 on a number line															
1.C.1.b	1.C.1.b. Create a graph in the first quadrant of a coordinate plane using ordered pairs of whole numbers (0-50)															
2.0	**2. Knowledge of Geometry - Students will apply the properties of one, two, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects**	***5***	***1***	***(2)***	***5***	***1***	***(4) (1)***	***5***	***1***	***(2) (1)***	***5***	***1***	***(2)***	***5***	***1***	***(2)***
2.A	**2.A. Plane Geometric Figures**															
2.A.1	**2.A.1. Analyze the properties of plane geometric figures to:**															
2.A.1.a	2.A.1.a. Identify or describe parallel or perpendicular lines or line segments in geometric figures or pictures															
2.A.1.b	2.A.1.b. Identify a polygon with no more than 8 sides as part of composite figure comprised of triangles or quadrilaterals															
2.A.2	2.A.2. Analyze geometric relationships to:															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
1.B.2	**1.B.2. Identify, write, or solve equations or inequalities to:**															
1.B.2.a	1.B.2.a. Represent relationships by using the appropriate relational symbols (>, <, =) and one operational symbol (+, -, x, ÷ with no remainders) on either side using whole numbers (0-400)															
1.B.2.b	1.B.2.b. Find the unknown in an equation with one operation (+, -, x, ÷ with no remainders) using whole numbers (0-2,000)															
1.C	**1.C. Numeric or Graphic Representations of Relationships**															
1.C.1	**1.C.1. Locate points on a number line or in a coordinate grid to:**															
1.C.1.a	1.C.1.a. Represent decimals with no more than two decimal places (0-100) or mixed numbers (0-10) with denominators of 2, 3, 4, 5, 6, 8, or 10 on a number line															
1.C.1.b	1.C.1.b. Create a graph in the first quadrant of a coordinate plane using ordered pairs of whole numbers (0-50)															
2.0	**2. Knowledge of Geometry - Students will apply the properties of one, two, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects**	***5***	***1***	***(3)***	***5***	***1***	***(2) (1)***	***5***	***1***	***(1)***	***5***	***1***	***(1)***	***5***	***1***	***(2) (1)***
2.A	**2.A. Plane Geometric Figures**															
2.A.1	**2.A.1. Analyze the properties of plane geometric figures to:**															
2.A.1.a	2.A.1.a. Identify or describe parallel or perpendicular lines or line segments in geometric figures or pictures															
2.A.1.b	2.A.1.b. Identify a polygon with no more than 8 sides as part of composite figure comprised of triangles or quadrilaterals															
2.A.2	**2.A.2. Analyze geometric relationships to:**															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
2.A.2.a	2.A.2.a. Compare or classify quadrilaterals including squares, rectangles, rhombi, parallelograms, or trapezoids by length of the sides or the types of the angles (Use the angle symbol <ABC)															
2.B	**2.B Solid Geometric Figures**															
2.B.1	**2.B.1 Analyze the properties of solid geometric figures to:**															
2.B.1.a	2.B.1.a. Identify or classify pyramids or prisms as triangular pyramids, rectangular pyramids, triangular prisms or rectangular prisms by the number of edges, faces, or vertices															
2.B.1.b	2.B.1.b. Classify prisms or pyramids as triangular or rectangular by the base															
2.B.2	**2.B.2. Analyze the relationship between plane geometric figures and surfaces of solid geometric figures to:**															
2.B.2.a	2.B.2.a Analyze or identify the number or arrangement of rectangles needed to make a rectangle prism															
2.B.2.b	2.B.2.b. Analyze or identify the number or arrangement of triangles/rectangles needed to make a triangular prism															
2.B.2.c.	2.B.2.c. Analyze or identify the number or arrangement of circles/rectangles needed to make a cylinder															
2.C	**2.C. Representation of Geometric Figures**															
2.C.1	**2.C.1. Represent plane geometric figures to:**															
2.C.1.a	2.C.1.a. Identify, describe or draw angles, parallel line segments or perpendicular line segments given their dimensions using whole numbers (0-20) or angle measurements (0^{o}-179^{o})															
2.D	**2.D Congruence of Similarity**															
2.D.1	**2.D.1 Analyze similar figures to:**															
2.D.1.a	2.D.1.a. Identify or describe geometric figures with the same shape and different size															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
2.A.2.a	2.A.2.a. Compare or classify quadrilaterals including squares, rectangles, rhombi, parallelograms, or trapezoids by length of the sides or the types of the angles (Use the angle symbol <ABC)															
2.B	**2.B Solid Geometric Figures**															
2.B.1	**2.B.1 Analyze the properties of solid geometric figures to:**															
2.B.1.a	2.B.1.a. Identify or classify pyramids or prisms as triangular pyramids, rectangular pyramids, triangular prisms or rectangular prisms by the number of edges, faces, or vertices															
2.B.1.b	2.B.1.b. Classify prisms or pyramids as triangular or rectangular by the base															
2.B.2	2.B.2. Analyze the relationship between plane geometric figures and surfaces of solid geometric figures to:															
2.B.2.a	2.B.2.a Analyze or identify the number or arrangement of rectangles needed to make a rectangle prism															
2.B.2.b	2.B.2.b. Analyze or identify the number or arrangement of triangles/rectangles needed to make a triangular prism															
2.B.2.c.	2.B.2.c. Analyze or identify the number or arrangement of circles/rectangles needed to make a cylinder															
2.C	**2.C. Representation of Geometric Figures**															
2.C.1	**2.C.1. Represent plane geometric figures to:**															
2.C.1.a	2.C.1.a. Identify, describe or draw angles, parallel line segments or perpendicular line segments given their dimensions using whole numbers (0-20) or angle measurements (0^{o}-179^{o})															
2.D	**2.D Congruence of Similarity**															
2.D.1	**2.D.1 Analyze similar figures to:**															
2.D.1.a	2.D.1.a. Identify or describe geometric figures with the same shape and different size															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
2.E	**2.E. Transformations**															
2.E.1	**2.E.1. Analyze a transformation to:**															
2.E.1.a	2.E.1.a. Identify or describe the given result of a translation (vertical), a reflection (over a horizontal line), or a rotation around a given point (90^{o} or 180^{o} around a given point) of a geometric figure or picture															
3.0	**3. Knowledge of Measurement - Students will identify attributes, units, or systems of measurement or apply a variety of techniques, formulas, tools or technology for determining measurements.**	***7***	***1***	***(2)***	***7***	***1***	***(2)***	***7***	***1***	***(1)***	***7***	***1***	***(1)***	***7***	***1***	***(1)***
3.A	**3.A. Measurement Scales**															
3.A.1	**3.A.1. Read scales to:**															
3.A.1.a	3.A.1.a. Estimate or determine weight to the nearest ounce or gram															
3.A.1.b	3.A.1.b. Estimate or determine capacity to the nearest ounce															
3.B	**3.B. Measurement Tools**															
3.B.1	**3.B.1. Use standard units to:**															
3.B.1.a	3.B.1.a. Measure length to the nearest 1/8 inch using a ruler															
3.B.2	**3.B.2. Use standard units to:**															
3.B.2.a	3.B.2.a. Measure angles (acute, right, obtuse) to the nearest degree using protractors															
3.C	**3.C. Applications in Measurement**															
3.C.1	**3.C.1. Estimate or apply formulas to:**															
3.C.1.a	3.C.1.a. Determine the perimeter of polygons with no more than 8 sides using whole numbers (0-500)															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
2.E	**2.E. Transformations**															
2.E.1	**2.E.1. Analyze a transformation to:**															
2.E.1.a	2.E.1.a. Identify or describe the given result of a translation (vertical), a reflection (over a horizontal line), or a rotation around a given point (90° or 180° around a given point) of a geometric figure or picture															
3.0	**3. Knowledge of Measurement - Students will identify attributes, units, or systems of measurement or apply a variety of techniques, formulas, tools or technology for determining measurements.**	***7***	***1***	***(1)*** ***(1)***	***7***	***1***	***(2)***	***7***	***1***	***(1)*** ***(1)***	***7***	***1***	***(3)***	***7***	***1***	***(1)***
3.A	**3.A. Measurement Scales**															
3.A.1	**3.A.1. Read scales to:**															
3.A.1.a	3.A.1.a. Estimate or determine weight to the nearest ounce or gram															
3.A.1.b	3.A.1.b. Estimate or determine capacity to the nearest ounce															
3.B	**3.B. Measurement Tools**															
3.B.1	**3.B.1. Use standard units to:**															
3.B.1.a	3.B.1.a. Measure length to the nearest 1/8 inch using a ruler															
3.B.2	**3.B.2. Use standard units to:**															
3.B.2.a	3.B.2.a. Measure angles (acute, right, obtuse) to the nearest degree using protractors															
3.C	**3.C. Applications in Measurement**															
3.C.1	**3.C.1. Estimate or apply formulas to:**															
3.C.1.a	3.C.1.a. Determine the perimeter of polygons with no more than 8 sides using whole numbers (0-500)															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
3.C.1.b	3.C.1.b. Determine the area of rectangles with whole numbers (0-200)															
3.C.1.c	3.C.1.c. Find the area or perimeter of any closed figure drawn on a grid using partial units (0-50)															
3.C.2	**3.C.2. Calculate to:**															
3.C.2.a	3.C.2.a. Find start, elapsed or end time to the nearest minute															
3.C.2.b	3.C.2.b Determine equivalent units of seconds, minutes, or hours															
3.C.2.c	3.C.2.c. Determine equivalent units of pints, quarts, or gallons															
4.0	**4. Knowledge of Statistics - Students will collect, organize, display, analyze, or interpret data to make decisions or predictions**	***8***	***1***	***(2) (1)***	***8***	***1***	***(2)***	***8***	***1***	***(3)***	***8***	***1***	***(2)***	***8***	***1***	***(1)***
4.A	**4.A. Data Displays**															
4.A.1	**4.A.1. Organize or display data to:**															
4.A.1.a	4.A.1.a. Make stem & leaf plots with no more than 20 data points using whole numbers (0-100)															
4.A.1.b	4.A.1.b. Make line plots with no more than 20 pieces of data with a range of no more than 20 using whole numbers (0-200)															
4.A.1.c	4.A.1.c. Make double bar graphs with no more than 4 categories and intervals of 1, 2, 5, or 10 using whole numbers (0-100)															
4.A.1.d	4.A.1.d. Make line graphs with y-axis having intervals of 1, 2, 4, 5, or 10 and x-axis with no more than 10 time intervals using whole numbers (0-100)															
4.B	**4.B. Data Analysis**															
4.B.1	**4.B.1. Analyze data to:**															
4.B.1.a	4.B.1.a. Interpret stem & leaf plots with no more than 20 pieces of data points using whole numbers (0-100)															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
3.C.1.b	3.C.1.b. Determine the area of rectangles with whole numbers (0-200)															
3.C.1.c	3.C.1.c. Find the area or perimeter of any closed figure drawn on a grid using partial units (0-50)															
3.C.2	**3.C.2. Calculate to:**															
3.C.2.a	3.C.2.a. Find start, elapsed or end time to the nearest minute															
3.C.2.b	3.C.2.b Determine equivalent units of seconds, minutes, or hours															
3.C.2.c	3.C.2.c. Determine equivalent units of pints, quarts, or gallons															
4.0	**4. Knowledge of Statistics - Students will collect, organize, display, analyze, or interpret data to make decisions or predictions**	***8***	***1***	***(1)***	***8***	***1***		***8***	***1***	***(1)***	***8***	***1***	***(1)***	***8***	***1***	***(2)***
4.A	**4.A. Data Displays**															
4.A.1	**4.A.1. Organize or display data to:**															
4.A.1.a	4.A.1.a. Make stem & leaf plots with no more than 20 data points using whole numbers (0-100)															
4.A.1.b	4.A.1.b. Make line plots with no more than 20 pieces of data with a range of no more than 20 using whole numbers (0-200)															
4.A.1.c	4.A.1.c. Make double bar graphs with no more than 4 categories and intervals of 1, 2, 5, or 10 using whole numbers (0-100)															
4.A.1.d	4.A.1.d. Make line graphs with y-axis having intervals of 1, 2, 4, 5, or 10 and x-axis with no more than 10 time intervals using whole numbers (0-100)															
4.B	**4.B. Data Analysis**															
4.B.1	**4.B.1. Analyze data to:**															
4.B.1.a	4.B.1.a. Interpret stem & leaf plots with no more than 20 pieces of data points using whole numbers (0-100)															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
4.B.1.b	4.B.1.b. Interpret line plots with no more than 20 pieces of data with a range of no more than 20 using whole numbers (0-100)															
4.B.1.c	4.B.1.c. Interpret double bar graphs with no more than 4 categories and intervals of 1, 2, 5, or 10 using whole numbers (0-1,000)															
4.B.1.d	4.B.1.d. Interpret double line graphs with y-axis having intervals of 1, 2, 5, or 10 and x-axis having no more than 10 time intervals using whole numbers (0-100)															
4.B.1.e	4.B.1.e. Read circle graphs with no more than 4 categories and data in whole numbers or percents which are multiples of 5 (0-100)															
4.B.2	**4.B.2 Determine measures of central tendency of a data set to:**															
4.B.2.a.	4.B.2.a Find the mean (no remainders) of a given data set with no more than 8 pieces of data using whole numbers (0-1,000)															
5.0	**5. Knowledge of Probability - Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.**	***3*** ***(1)***	***1***		***3***	***1*** ***(1)***		***3***	***1***		***3*** ***(2)***	***1***		***3*** ***(1)***	***1***	
5.A	**5.A. Sample Space**															
5.A.1	**5.A.1. Identify members of a sample space to:**															
5.A.1.a	5.A.1.a. Determine all possible outcomes of two independent events with no more than 4 outcomes each, using an organized list or tree diagram															
5.B	**5.B. Theoretical Probability**															
5.B.1	**5.B.1. Determine the probability of one simple event comprised of equally likely outcomes to:**															
5.B.1.a	5.B.1.a Express the probability as a fraction with a sample space of no more than 20 outcomes															
6.0	**6. Knowledge of Number Relationships or Computation - Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.**	***13*** ***(3)***	***2***		***13*** ***(1)***	***2***		***13*** ***(2)***	***2*** ***(1)***		***13*** ***(3)***	***2*** ***(2)***		***13*** ***(3)***	***2*** ***(1)***	

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
4.B.1.b	4.B.1.b. Interpret line plots with no more than 20 pieces of data with a range of no more than 20 using whole numbers (0-100)															
4.B.1.c	4.B.1.c. Interpret double bar graphs with no more than 4 categories and intervals of 1, 2, 5, or 10 using whole numbers (0-1,000)															
4.B.1.d	4.B.1.d. Interpret double line graphs with y-axis having intervals of 1, 2, 5, or 10 and x-axis having no more than 10 time intervals using whole numbers (0-100)															
4.B.1.e	4.B.1.e. Read circle graphs with no more than 4 categories and data in whole numbers or percents which are multiples of 5 (0-100)															
4.B.2	**4.B.2 Determine measures of central tendency of a data set to:**															
4.B.2.a.	4.B.2.a Find the mean (no remainders) of a given data set with no more than 8 pieces of data using whole numbers (0-1,000)															
5.0	**5. Knowledge of Probability - Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.**	***3***	***1***		***3***	***1***	***(2)***	***3***	***1***		***3***	***1***	***(2)***	***3***	***1***	***(1)***
5.A	**5.A. Sample Space**															
5.A.1	**5.A.1. Identify members of a sample space to:**															
5.A.1.a	5.A.1.a. Determine all possible outcomes of two independent events with no more than 4 outcomes each, using an organized list or tree diagram															
5.B	**5.B. Theoretical Probability**															
5.B.1	**5.B.1. Determine the probability of one simple event comprised of equally likely outcomes to:**															
5.B.1.a	5.B.1.a Express the probability as a fraction with a sample space of no more than 20 outcomes															
6.0	**6. Knowledge of Number Relationships or Computation - Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.**	***13***	***2***	***(4) (1)***	***13***	***2***	***(3) (1)***	***13***	***2***	***(7) (1)***	***13***	***2***	***(3) (1)***	***13***	***2***	***(3) (1)***

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
6.A	**6.A. Knowledge of Number or Place Value**															
6.A.1.	**6.A.1. Apply Knowledge of fractions, decimals, or place value to:**															
6.A.1.a	6.A.1.a. Read, write, or represent fractions or mixed numbers with denominators as factors of 24 using symbols, words, or models (0-200)															
6.A.1.b	6.A.1.b. Read, write, or represent decimals with no more than 3 decimal places or percents using symbols, words, or models (0-100)															
6.A.1.c	6.A.1.c. Identify or determine equivalent forms of proper fractions with denominators that are factors of 100, decimals, or percents (0-200)															
6.A.1.d	6.A.1.d. Compare or order no more than 4 fractions or mixed numbers with denominators that are factors of 100 with or without using the symbols (>, <, =) (0-100)															
6.A.1.e	6.A.1.e. Compare, order, or describe no more than 4 decimals with no more than 3 decimal places with or without using the symbols (>, <, =) (0-100)															
6.B	**6.B. Number Theory**															
6.B.1	**6.B.1. Apply number relationships to:**															
6.B.1.a	6.B.1.a. Identify or describe whole numbers as prime or composite (0-100)															
6.B.1.b	6.B.1.b. Identify or use rules of divisibility for 2, 3, 5, 9, or 10 with whole numbers (0-10,000)															
6.B.1.c	6.B.1.c. Identify the greatest common factor which is no more than 10 of two whole numbers (0-100)															
6.B.1.d	6.B.1.d. Identify a common multiple or the least common multiple of no more than 4 single digit whole numbers															
6.C	**6.C. Number Computation**															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
6.A	**6.A. Knowledge of Number or Place Value**															
6.A.1.	**6.A.1. Apply Knowledge of fractions, decimals, or place value to:**															
6.A.1.a	6.A.1.a. Read, write, or represent fractions or mixed numbers with denominators as factors of 24 using symbols, words, or models (0-200)															
6.A.1.b	6.A.1.b. Read, write, or represent decimals with no more than 3 decimal places or percents using symbols, words, or models (0-100)															
6.A.1.c	6.A.1.c. Identify or determine equivalent forms of proper fractions with denominators that are factors of 100, decimals, or percents (0-200)															
6.A.1.d	6.A.1.d. Compare or order no more than 4 fractions or mixed numbers with denominators that are factors of 100 with or without using the symbols (>, <, =) (0-100)															
6.A.1.e	6.A.1.e. Compare, order, or describe no more than 4 decimals with no more than 3 decimal places with or without using the symbols (>, <, =) (0-100)															
6.B	**6.B. Number Theory**															
6.B.1	**6.B.1. Apply number relationships to:**															
6.B.1.a	6.B.1.a. Identify or describe whole numbers as prime or composite (0-100)															
6.B.1.b	6.B.1.b. Identify or use rules of divisibility for 2, 3, 5, 9, or 10 with whole numbers (0-10,000)															
6.B.1.c	6.B.1.c. Identify the greatest common factor which is no more than 10 of two whole numbers (0-100)															
6.B.1.d	6.B.1.d. Identify a common multiple or the least common multiple of no more than 4 single digit whole numbers															
6.C	**6.C. Number Computation**															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
6.C.1	**6.C.1. Analyze number relationships or compute to:**															
6.C.1.a	6.C.1.a. Multiply a 3-digit factor by another factor with no more than 2-digits using whole numbers (0-10,000)															
6.C.1.b	6.C.1.b. Divide a dividend with no more than a 4-digit dividend by a 2-digit divisor using whole numbers (0-10,000)															
6.C.1.c	6.C.1.c. Interpret quotients (including remainders) with no more than a 3-digit dividend by a 1- or 2-digit divisor using whole numbers (0-1,000)															
6.C.1.d	6.C.1.d. Add or subtract proper fractions or mixed numbers with denominators as factors of 24 and answers in simplest form (0-20)															
6.C.1.e	6.C.1.e. Add decimals, including monetary notation, with no more than 4 addends and no more than 3 decimal places in each addend (0-1,000)															
6.C.1.f	6.C.1.f. Subtract decimals including monetary notation with a minuend and subtrahend with no more than 3 decimal places (0-1,000)															
6.C.1.g	6.C.1.g. Multiply a decimal in monetary notation by a single digit whole number (0-100)															
6.C.2	**6.C.2. Estimate to:**															
6.C.2.a	6.C.2.a. Determine sum of no more than 3 addends with no more than 3 decimal places in each addend or the difference of a minuend and subtrahend with no more than 3 decimal places (0-1,000)															
6.C.2.b	6.C.2.b. Determine the product of one 1-digit factor with the other factor having no more than 3 digits or the quotient of a dividend having no more than 3 digits and a 1-digit divisor using whole numbers (0-5,000)															
6.C.2.c	6.C.2.c. Determine the product of a decimal in monetary notation by a single digit whole number (0-100)															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
6.C.1	**6.C.1. Analyze number relationships or compute to:**															
6.C.1.a	6.C.1.a. Multiply a 3-digit factor by another factor with no more than 2-digits using whole numbers (0-10,000)															
6.C.1.b	6.C.1.b. Divide a dividend with no more than a 4-digit dividend by a 2-digit divisor using whole numbers (0-10,000)															
6.C.1.c	6.C.1.c. Interpret quotients (including remainders) with no more than a 3-digit dividend by a 1- or 2-digit divisor using whole numbers (0-1,000)															
6.C.1.d	6.C.1.d. Add or subtract proper fractions or mixed numbers with denominators as factors of 24 and answers in simplest form (0-20)															
6.C.1.e	6.C.1.e. Add decimals, including monetary notation, with no more than 4 addends and no more than 3 decimal places in each addend (0-1,000)															
6.C.1.f	6.C.1.f. Subtract decimals including monetary notation with a minuend and subtrahend with no more than 3 decimal places (0-1,000)															
6.C.1.g	6.C.1.g. Multiply a decimal in monetary notation by a single digit whole number (0-100)															
6.C.2	**6.C.2. Estimate to:**															
6.C.2.a	6.C.2.a. Determine sum of no more than 3 addends with no more than 3 decimal places in each addend or the difference of a minuend and subtrahend with no more than 3 decimal places (0-1,000)															
6.C.2.b	6.C.2.b. Determine the product of one 1-digit factor with the other factor having no more than 3 digits or the quotient of a dividend having no more than 3 digits and a 1-digit divisor using whole numbers (0-5,000)															
6.C.2.c	6.C.2.c. Determine the product of a decimal in monetary notation by a single digit whole number (0-100)															

Note. Number in parentheses indicates the total number of field test items.

Table D.4 The 2008 MSA-Math Blueprint: Grade 6

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
1.0	**1. Knowledge of Algebra, Patterns, or Functions-** **Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships.**	***12*** ***(3)***	***1*** ***(1)***	***1*** ***(1)***	***12*** ***(1)***	***1*** ***(1)***	***1*** ***(1)***	***12*** ***(2)***	***1***	***1*** ***(1)***	***12*** ***(2)***	***1***	***1*** ***(1)***	***12*** ***(2)***	***1***	***1*** ***(1)***
1.A	**1.A. Patterns or Functions**															
1.A.1	**1.A.1. Identify, describe, extend, or create numeric patterns or functions to:**															
1.A.1.a	1.A.1.a. Interpret or write the rule for a one operation (+, -, x, ÷) function table using whole numbers or decimals with no more than two decimal places (0-10,000)															
1.A.1.b	1.A.1.b. Complete a function table using a given two-operations (+, -, x) rule using whole numbers no more than 10 in the rule (0-50)															
1.B	**1.B. Expressions, Equations, or Inequalities**															
1.B.1	**1.B.1. Write or evaluate expressions to:**															
1.B.1.a	1.B.1.a. Represent unknown quantities with one unknown and one operation (+, -) using whole numbers (0-200), fractions with denominators as factors of 24 (0-50), or decimals with no more than two decimal places (0-50)															
1.B.1.b	1.B.1.b. Determine the value of algebraic expressions with one unknown and one operation (+, -) using whole numbers (0-200), fractions with denominators as factors of 24 (0-50), or decimals with no more than two decimal places (0-50)															
1.B.1.c	1.B.1.c. Determine the value of numeric expressions using order of operations (+, -, x, ÷, with no remainders) with no more than 4 operations and 1 set of grouping symbols using parentheses or a division bar with whole numbers (0-100)															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
1.0	**1. Knowledge of Algebra, Patterns, or Functions-** **Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships.**	***12***	***1***	***1*** ***(1)***	***12*** ***(1)***	***1***	***1*** ***(1)***	***12*** ***(2)***	***1***	***1*** ***(1)***	***12*** ***(1)***	***1***	***1*** ***(1)***	***12*** ***(1)***	***1***	***1*** ***(1)***
1.A	**1.A. Patterns or Functions**															
1.A.1	**1.A.1. Identify, describe, extend, or create numeric patterns or functions to:**															
1.A.1.a	1.A.1.a. Interpret or write the rule for a one operation (+, -, x, ÷) function table using whole numbers or decimals with no more than two decimal places (0-10,000)															
1.A.1.b	1.A.1.b. Complete a function table using a given two-operations (+, -, x) rule using whole numbers no more than 10 in the rule (0-50)															
1.B	**1.B. Expressions, Equations, or Inequalities**															
1.B.1	**1.B.1. Write or evaluate expressions to:**															
1.B.1.a	1.B.1.a. Represent unknown quantities with one unknown and one operation (+, -) using whole numbers (0-200), fractions with denominators as factors of 24 (0-50), or decimals with no more than two decimal places (0-50)															
1.B.1.b	1.B.1.b. Determine the value of algebraic expressions with one unknown and one operation (+, -) using whole numbers (0-200), fractions with denominators as factors of 24 (0-50), or decimals with no more than two decimal places (0-50)															
1.B.1.c	1.B.1.c. Determine the value of numeric expressions using order of operations (+, -, x, ÷, with no remainders) with no more than 4 operations and 1 set of grouping symbols using parentheses or a division bar with whole numbers (0-100)															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
1.B.2	**1.B.2. Identify, write, or solve equations or inequalities to:**															
1.B.2.a	1.B.2.a. Represent relationships using a variable with the appropriate relational symbols (>, <, =) and one operational symbol (+, -, x, ÷) on either side using fractions with denominators as factors of 24 (0-50), or decimals with no more than two decimal places (0-50)															
1.B.2.b	1.B.2.b. Find the unknown in an equation with one operation (+, -, x, ÷, with no remainder) and positive coefficients using decimals with no more than two decimal places (0-100)															
1.C	**1.C. Numeric or Graphic Representations of Relationships**															
1.C.1	**1.C.1. Locate points on a number line or in a coordinate plane to:**															
1.C.1.a	1.C.1.a. Represent integers (-20 to 20) on a number line															
1.C.1.b	1.C.1.b. Create a graph in the coordinate plane using no more than 3 ordered pairs of integers (-20 to 20) or no more than 3 ordered pairs with fractions/mixed numbers with denominators of 2 (-10 to 10)															
1.C.2	**1.C.2. Analyze linear relationships to:**															
1.C.2.a	1.C.2.a. Identify given graph of a line that shows increase, decrease, or no change															
2.0	**2. Knowledge of Geometry - Students will apply the properties of one, two, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects**	***7***	***1***	***(3)***	***7***	***1***	***(1) (1)***	***7***	***1***	***(1)***	***7***	***1***	***(1) (1)***	***7***	***1***	
2.A	**2.A. Plane Geometric Figures**															
2.A.1	**2.A.1. Analyze the properties of plane geometric figures to:**															
2.A.1.a	2.A.1.a. Identify or describe diagonal line segments															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
1.B.2	**1.B.2. Identify, write, or solve equations or inequalities to:**															
1.B.2.a	1.B.2.a. Represent relationships using a variable with the appropriate relational symbols (>, <, =) and one operational symbol (+, -, x, ÷) on either side using fractions with denominators as factors of 24 (0-50), or decimals with no more than two decimal places (0-50)															
1.B.2.b	1.B.2.b. Find the unknown in an equation with one operation (+, -, x, ÷, with no remainder) and positive coefficients using decimals with no more than two decimal places (0-100)															
1.C	**1.C. Numeric or Graphic Representations of Relationships**															
1.C.1	**1.C.1. Locate points on a number line or in a coordinate plane to:**															
1.C.1.a	1.C.1.a. Represent integers (-20 to 20) on a number line															
1.C.1.b	1.C.1.b. Create a graph in the coordinate plane using no more than 3 ordered pairs of integers (-20 to 20) or no more than 3 ordered pairs with fractions/mixed numbers with denominators of 2 (-10 to 10)															
1.C.2	**1.C.2. Analyze linear relationships to:**															
1.C.2.a	1.C.2.a. Identify given graph of a line that shows increase, decrease, or no change															
2.0	**2. Knowledge of Geometry - Students will apply the properties of one, two, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects**	***7***	***1***	***(3)***	***7***	***1***	***(4)***	***7***	***1***	***(2)***	***7***	***1***	***(3)***	***7***	***1***	***(1)***
2.A	**2.A. Plane Geometric Figures**															
2.A.1	**2.A.1. Analyze the properties of plane geometric figures to:**															
2.A.1.a	2.A.1.a. Identify or describe diagonal line segments															

Note. Number in parentheses indicates the total number of field test items.

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Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
2.A.1.b	2.A.1.b. Identify or describe the radius, diameter, or circumference of a circle															
2.A.2	**2.A.2. Analyze geometric relationships to:**															
2.A.2.a	2.A.2.a. Compare or classify triangles as scalene, equilateral, or isosceles															
2.A.2.b	2.A.2.b. Compare or classify triangles as equiangular, obtuse, acute, or right															
2.A.2.c	2.A.2.c. Apply the concept of the sum of angles in any triangle is 180^{o} without using a diagram															
2.A.2.d	2.A.2.d. Identify or compare circumference, radii, or diameter of a circle (pi = 3.14)															
2.C	**2.C. Representation of Geometric Figures**															
2.C.1	**2.C.1. Represent plane geometric figures to:**															
2.C.1.a	2.C.1.a. Draw triangles given the measure of 2 sides and one angle or 2 angles and 1 side using whole numbers (0-20) and angle measures (0^{o} - 179^{o})															
2.C.1.b	2.C.1.b. Identify, describe or draw a polygon in the first quadrant given no more than six coordinates															
2.C.1.c	2.C.1.c. Identify or describe perpendicular bisectors or angle bisectors															
3.0	**3. Knowledge of Measurement - Students will identify attributes, units, or systems of measurement or apply a variety of techniques, formulas, tools or technology for determining measurements.**	***5***	***1***		***5***	***1***	***(1)***	***5***	***1***	***(2)***	***5***	***1***	***(3)***	***5***	***1***	***(2) (1)***
3.B	**3.B. Measurement Tools**															
3.B.1	**3.B.1. Use standard units to:**															
3.B.1.a	3.B.1.a. Measure length to the nearest 1/16 inch using a ruler															
3.C	**3.C. Applications in Measurement**															
3.C.1	**3.C.1. Estimate or apply formulas to:**															
3.C.1.a	3.C.1.a. Determine the area of a triangle with whole number dimensions (0-200)															
3.C.1.b	3.C.1.b. Determine the volume of rectangular prisms with whole number dimensions (0-1,000)															

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
2.A.1.b	2.A.1.b. Identify or describe the radius, diameter, or circumference of a circle															
2.A.2	**2.A.2. Analyze geometric relationships to:**															
2.A.2.a	2.A.2.a. Compare or classify triangles as scalene, equilateral, or isosceles															
2.A.2.b	2.A.2.b. Compare or classify triangles as equiangular, obtuse, acute, or right															
2.A.2.c	2.A.2.c. Apply the concept of the sum of angles in any triangle is 180^{o} without using a diagram															
2.A.2.d	2.A.2.d. Identify or compare circumference, radii, or diameter of a circle (pi = 3.14)															
2.C	**2.C. Representation of Geometric Figures**															
2.C.1	**2.C.1. Represent plane geometric figures to:**															
2.C.1.a	2.C.1.a. Draw triangles given the measure of 2 sides and one angle or 2 angles and 1 side using whole numbers (0-20) and angle measures (0^{o} - 179^{o})															
2.C.1.b	2.C.1.b. Identify, describe or draw a polygon in the first quadrant given no more than six coordinates															
2.C.1.c	2.C.1.c. Identify or describe perpendicular bisectors or angle bisectors															
3.0	**3. Knowledge of Measurement - Students will identify attributes, units, or systems of measurement or apply a variety of techniques, formulas, tools or technology for determining measurements.**	***5***	***1***	***(1)***	***5***	***1***		***5***	***1***	***(2)***	***5***	***1***	***(1)***	***5***	***1***	***(3) (1)***
3.B	**3.B. Measurement Tools**															
3.B.1	**3.B.1. Use standard units to:**															
3.B.1.a	3.B.1.a. Measure length to the nearest 1/16 inch using a ruler															
3.C	**3.C. Applications in Measurement**															
3.C.1	**3.C.1. Estimate or apply formulas to:**															
3.C.1.a	3.C.1.a. Determine the area of a triangle with whole number dimensions (0-200)															
3.C.1.b	3.C.1.b. Determine the volume of rectangular prisms with whole number dimensions (0-1,000)															

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
3.C.1.c	3.C.1.c. Determine the area of composite figures using no more than 4 polygons (triangles or rectangles) with whole number dimensions (0-200)															
3.C.1.d	3.C.1.d. Determine the missing dimension of a quadrilateral given the perimeter using whole number dimensions (0-200)															
3.C.1.e	3.C.1.e. Determine the missing dimension of a square or rectangle given the area using whole number dimensions (0-200)															
4.0	**4. Knowledge of Statistics - Students will collect, organize, display, analyze, or interpret data to make decisions or predictions**	***8***	***1***		***8***	***1***	***(2)***	***8***	***1***	***(3)***	***8***	***1***	***(1)***	***8***	***1***	***(2)***
4.A	**4.A. Data Displays**															
4.A.1	**4.A.1. Organize or display data to:**															
4.A.1.a	4.A.1.a. Make frequency tables with no more than 5 categories or ranges of numbers and frequencies of no more than 25															
4.A.1.b	4.A.1.b. Make stem-and-leaf plots with no more than 20 data points using whole numbers (0-1,000)															
4.B	**4.B. Data Analysis**															
4.B.1	**4.B.1. Analyze data to:**															
4.B.1.a	4.B.1.a. Interpret frequency tables with no more than 5 categories or ranges of numbers and frequencies of no more than 25															
4.B.1.b	4.B.1.b. Read or analyze circle graphs with no more than 5 categories using data in whole numbers or percents (0-1,000)															
5.0	**5. Knowledge of Probability - Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.**	***4***		***(2)***	***4***		***(1)***	***4***		***(2)***	***4***		***(2)***	***4***		***(1)***
5.B	**5.B. Theoretical Probability**															
5.B.1	**5.B.1. Determine the probability of one simple event comprised of equality likely outcomes to:**															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
3.C.1.c	3.C.1.c. Determine the area of composite figures using no more than 4 polygons (triangles or rectangles) with whole number dimensions (0-200)															
3.C.1.d	3.C.1.d. Determine the missing dimension of a quadrilateral given the perimeter using whole number dimensions (0-200)															
3.C.1.e	3.C.1.e. Determine the missing dimension of a square or rectangle given the area using whole number dimensions (0-200)															
4.0	**4. Knowledge of Statistics - Students will collect, organize, display, analyze, or interpret data to make decisions or predictions**	***8***	***1***	***(5)***	***8***	***1***	***(4) (1)***	***8***	***1***	***(2)***	***8***	***1***	***(2)***	***8***	***1***	***(2)***
4.A	**4.A. Data Displays**															
4.A.1	**4.A.1. Organize or display data to:**															
4.A.1.a	4.A.1.a. Make frequency tables with no more than 5 categories or ranges of numbers and frequencies of no more than 25															
4.A.1.b	4.A.1.b. Make stem-and-leaf plots with no more than 20 data points using whole numbers (0-1,000)															
4.B	**4.B. Data Analysis**															
4.B.1	**4.B.1. Analyze data to:**															
4.B.1.a	4.B.1.a. Interpret frequency tables with no more than 5 categories or ranges of numbers and frequencies of no more than 25															
4.B.1.b	4.B.1.b. Read or analyze circle graphs with no more than 5 categories using data in whole numbers or percents (0-1,000)															
5.0	**5. Knowledge of Probability - Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.**	***4***			***4***		***(1)***	***4***		***(2)***	***4***		***(1)***	***4***		***(3)***
5.B	**5.B. Theoretical Probability**															
5.B.1	**5.B.1. Determine the probability of one simple event comprised of equality likely outcomes to:**															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
5.B.1.a	5.B.1.a Express the probability as a decimal with a sample space of 10, 20, 25, or 50 outcomes															
5.C	**5.C. Experimental Probability**															
5.C.1	**5.C.1. Analyze the results of a probability experiment to:**															
5.C.1.a	5.C.1.a. Make predictions and express the experimental probability as a fraction, decimal, or percent with no more than 30 results															
6.0	**6. Knowledge of Number Relationships or Computation - Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.**	***12*** ***(3)***	***2*** ***(1)***		***12*** ***(6)***	***2***		***12*** ***(2)***	***2*** ***(1)***		***12*** ***(4)***	***2***		***12*** ***(5)***	***2*** ***(1)***	
6.A	**6.A. Knowledge of Number or Place Value**															
6.A.1.	**6.A.1. Apply Knowledge of rational numbers or place value to:**															
6.A.1.a	6.A.1.a. Read, write, or represent whole numbers using exponential form using powers of 10 (0-10,000)															
6.A.1.b	6.A.1.b. Read, write, or represent integers (-100 to 100)															
6.A.1.c	6.A.1.c. Identify or determine equivalent forms of proper fractions with denominators as factors of 100, decimals, percents, or ratios (0-1,000)															
6.A.1.d	6.A.1.d. Compare or order no more than 4 fractions with denominators as factors of 100 to decimals with up to 2 decimal places with or without using the symbols (<, >, =) (0-100)															
6.C	**6.C. Number Computation**															
6.C.1	**6.C.1. Analyze number relationships or compute to:**															
6.C.1.a	6.C.1.a. Add or subtract proper fractions or mixed numbers with denominator as factors of 60 and answers in simplest form (0-20)															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
5.B.1.a	5.B.1.a Express the probability as a decimal with a sample space of 10, 20, 25, or 50 outcomes															
5.C	**5.C. Experimental Probability**															
5.C.1	**5.C.1. Analyze the results of a probability experiment to:**															
5.C.1.a	5.C.1.a. Make predictions and express the experimental probability as a fraction, decimal, or percent with no more than 30 results															
6.0	**6. Knowledge of Number Relationships or Computation - Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.**	***12***	***2***	***(2) (1)***	***12***	***2***	***(2) (1)***	***12***	***2***	***(2) (2)***	***12***	***2***	***(4) (2)***	***12***	***2***	***(2) (1)***
6.A	**6.A. Knowledge of Number or Place Value**															
6.A.1.	**6.A.1. Apply Knowledge of rational numbers or place value to:**															
6.A.1.a	6.A.1.a. Read, write, or represent whole numbers using exponential form using powers of 10 (0-10,000)															
6.A.1.b	6.A.1.b. Read, write, or represent integers (-100 to 100)															
6.A.1.c	6.A.1.c. Identify or determine equivalent forms of proper fractions with denominators as factors of 100, decimals, percents, or ratios (0-1,000)															
6.A.1.d	6.A.1.d. Compare or order no more than 4 fractions with denominators as factors of 100 to decimals with up to 2 decimal places with or without using the symbols (<, >, =) (0-100)															
6.C	**6.C. Number Computation**															
6.C.1	**6.C.1. Analyze number relationships or compute to:**															
6.C.1.a	6.C.1.a. Add or subtract proper fractions or mixed numbers with denominator as factors of 60 and answers in simplest form (0-20)															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)			No. of Augmented Items (Form B)			No. of Augmented Items (Form C)			No. of Augmented Items (Form D)			No. of Augmented Items (Form E)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
6.C.1.b	6.C.1.b. Multiply proper fractions or mixed numbers with denominators as factors of 24 not including 24 and express answers in simplest form (0-20)															
6.C.1.c	6.C.1.c. Multiply a decimal with no more than 3-digits by a 2 digit decimal (0-1,000)															
6.C.1.d	6.C.1.d. Divide a decimal with no more than a 5-digits by whole number with no more than 2 digits without annexing zeros (0-1,000)															
6.C.1.e	6.C.1.e. Determine 10%, 20%, 25%, or 50% of a whole number (0-1,000)															
6.C.1.f	6.C.1.f. Use the distributive property to simplify numeric expressions using whole numbers (0-1,000)															
6.C.2	**6.C.2. Estimate to:**															
6.C.2.a	6.C.2.a. Determine the product of a decimal with no more than 3-digits by a 2-digit whole number or the quotient of a decimal with no more than 5-digits in the dividend by a 2-digit whole number (0-1,000)															

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)			No. of Augmented Items (Form G)			No. of Augmented Items (Form H)			No. of Augmented Items (Form J)			No. of Augmented Items (Form K)		
		SR	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*	*SR*	*BCR*	*ECR*
6.C.1.b	6.C.1.b. Multiply proper fractions or mixed numbers with denominators as factors of 24 not including 24 and express answers in simplest form (0-20)															
6.C.1.c	6.C.1.c. Multiply a decimal with no more than 3-digits by a 2 digit decimal (0-1,000)															
6.C.1.d	6.C.1.d. Divide a decimal with no more than a 5-digits by whole number with no more than 2 digits without annexing zeros (0-1,000)															
6.C.1.e	6.C.1.e. Determine 10%, 20%, 25%, or 50% of a whole number (0-1,000)															
6.C.1.f	6.C.1.f. Use the distributive property to simplify numeric expressions using whole numbers (0-1,000)															
6.C.2	**6.C.2. Estimate to:**															
6.C.2.a	6.C.2.a. Determine the product of a decimal with no more than 3-digits by a 2-digit whole number or the quotient of a decimal with no more than 5-digits in the dividend by a 2-digit whole number (0-1,000)															

Note. Number in parentheses indicates the total number of field test items.

Table D.5 The 2008 MSA- Mathematics Blueprint: Grade 7

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
1.0	**1. Knowledge of Algebra, Patterns, or Functions - Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships.**	***9***	***3***	***1***	***1***	***9***	***3***	***1***	***1***	***9***	***3***	***1***	***1***	***9***	***3***	***1***	***1***	***9***	***3***	***1***	***1***
		(1)	***(1)***	***(1)***		***(1)***	***(1)***	***(1)***	***(1)***	***(1)***	***(2)***			***(1)***	***(1)***	***(1)***		***(2)***		***(1)***	
1.A	**1.A. Patterns or Functions**																				
1.A.1	**1.A.1. Identify, describe, extend, or create linear patterns or functions to:**																				
1.A.1.a	1.A.1.a. Complete a function table using a given two-operations (+, -, x) rule whose numbers are whole numbers no more than 20 in the rule and whole numbers (0-500)																				
1.B	**1.B. Expressions, Equations, or Inequalities**																				
1.B.1	**1.B.1. Write or evaluate expressions to:**																				
1.B.1.a	1.B.1.a. Represent unknown quantities with one unknown and one or two operations (+, -, x, ÷ with no remainders) using whole numbers (0-20), fractions with denominators as factors of 100 (0-20), or decimals with no more than three decimal places (0-20)																				
1.B.1.b	1.B.1.b. Determine the value of algebraic expressions with one unknown and no more than two operations (+, -, x, ÷ with no remainders) using whole numbers (0-200), fractions with denominators as factors of 100 (0-100), or decimals with no more than three decimal places (0-100)																				
1.B.1.c	1.B.1.c. Determine the value of numeric expressions using order of operations with no more than 4 operation (+, -, x, ÷ with no remainders) and 1 set of grouping symbols using parentheses, brackets, or a division bar using whole numbers (0-200), fractions with denominators as factors of 100 (0-100) or decimals with no more than three decimal places (0-100)																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
1.0	**1. Knowledge of Algebra, Patterns, or Functions - Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships.**	***9***	***3***	***1***	***1***	***9***	***3***	***1***	***1***	***9***	***3***	***1***	***1***	***9***	***3***	***1***	***1***	***9***	***3***	***1***	***1***
		(4)		***(1)***	***(1)***	***(4)***		***(1)***	***(1)***	***(3)***		***(1)***		***(4)***		***(1)***		***(4)***		***(1)***	
1.A	**1.A. Patterns or Functions**																				
1.A.1	**1.A.1. Identify, describe, extend, or create linear patterns or functions to:**																				
1.A.1.a	1.A.1.a. Complete a function table using a given two-operations (+, -, x) rule whose numbers are whole numbers no more than 20 in the rule and whole numbers (0-500)																				
1.B	**1.B. Expressions, Equations, or Inequalities**																				
1.B.1	**1.B.1. Write or evaluate expressions to:**																				
1.B.1.a	1.B.1.a. Represent unknown quantities with one unknown and one or two operations (+, -, x, ÷ with no remainders) using whole numbers (0-20), fractions with denominators as factors of 100 (0-20), or decimals with no more than three decimal places (0-20)																				
1.B.1.b	1.B.1.b. Determine the value of algebraic expressions with one unknown and no more than two operations (+, -, x, ÷ with no remainders) using whole numbers (0-200), fractions with denominators as factors of 100 (0-100), or decimals with no more than three decimal places (0-100)																				
1.B.1.c	1.B.1.c. Determine the value of numeric expressions using order of operations with no more than 4 operation (+, -, x, ÷ with no remainders) and 1 set of grouping symbols using parentheses, brackets, or a division bar using whole numbers (0-200), fractions with denominators as factors of 100 (0-100) or decimals with no more than three decimal places (0-100)																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
1.B.2	**1.B.2. Identify, write, or solve equations or inequalities to:**																				
1.B.2.a	1.B.2.a. Represent relationships using a variable with the appropriate relational symbols (>, ≥, <, ≤, =) and one or two operational symbols (+, -, x, ÷) on either side using whole numbers (0-20), fractions with denominators as factors of 100 (0-20) or decimals with no more than three decimal places (0-20)																				
1.B.2.b	1.B.2.b. Find the unknown (used only once) in an equation with one or two operations (+, -, x) using whole numbers (0-500), fractions with denominators as factors of 100 (0-50), or decimals with no more than three decimal places (0-100)																				
1.B.2.c	1.B.2.c. Find the unknown in an inequality with one variable with a positive whole number whole coefficient with one operation (+, -, x, ÷ with no remainders) using whole numbers or decimals with no more than 2 decimal places (0-100)																				
1.B.2.d	1.B.2.d. Identify or graph solutions or inequalities on a number line using whole numbers (0-50)																				
1.B.2.e	1.B.2.e. Apply given formulas having no more than three variables and up to two operations using whole numbers (0-100), fractions with denominators as factors of 100 (0-100), or decimals with no more than three decimal places (0-100)																				
1.C	**1.C. Numeric or Graphic Representations of Relationships**																				
1.C.1	**1.C.1. Locate points on a number line or in a coordinate plane to:**																				
1.C.1.a	1.C.1.a. Represent rational numbers on a number line (-100 to 100)																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
1.B.2	**1.B.2. Identify, write, or solve equations or inequalities to:**																				
1.B.2.a	1.B.2.a. Represent relationships using a variable with the appropriate relational symbols (>, ≥, <, ≤, =) and one or two operational symbols (+, -, x, ÷) on either side using whole numbers (0-20), fractions with denominators as factors of 100 (0-20) or decimals with no more than three decimal places (0-20)																				
1.B.2.b	1.B.2.b. Find the unknown (used only once) in an equation with one or two operations (+, -, x) using whole numbers (0-500), fractions with denominators as factors of 100 (0-50), or decimals with no more than three decimal places (0-100)																				
1.B.2.c	1.B.2.c. Find the unknown in an inequality with one variable with a positive whole number whole coefficient with one operation (+, -, x, ÷ with no remainders) using whole numbers or decimals with no more than 2 decimal places (0-100)																				
1.B.2.d	1.B.2.d. Identify or graph solutions or inequalities on a number line using whole numbers (0-50)																				
1.B.2.e	1.B.2.e. Apply given formulas having no more than three variables and up to two operations using whole numbers (0-100), fractions with denominators as factors of 100 (0-100), or decimals with no more than three decimal places (0-100)																				
1.C	**1.C. Numeric or Graphic Representations of Relationships**																				
1.C.1	**1.C.1. Locate points on a number line or in a coordinate plane to:**																				
1.C.1.a	1.C.1.a. Represent rational numbers on a number line (-100 to 100)																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
1.C.1.b	1.C.1.b. Create a graph in the coordinate plane using no more than 4 ordered pairs of rational numbers (-20 to 20)																				
1.C.2	**1.C.2. Analyze linear relationships to:**																				
1.C.2.a.	1.C.2.a. Identify a table of values that shows increase, decrease, or no change																				
2.0	**2. Knowledge of Geometry - Students will apply the properties of one -, two -, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects**	***4***	***2***	***1***		***4***	***2***	***1***		***4***	***2***	***1***		***4***	***2***	***1***		***4***	***2***	***1***	
						(1)	***(1)***	***(1)***		***(1)***	***(1)***	***(1)***	***(1)***	***(1)***			***(1)***				***(1)***
2.A	**2.A. Plane Geometric Figures**																				
2.A.1	**2.A.1. Analyze the properties of plane geometric figures to:**																				
2.A.1.a	2.A.1.a. Identify or describe vertical, adjacent, complementary, or supplementary angles (Use the angle notation m)																				
2.A.2	**2.A.2. Analyze geometric relationships to:**																				
2.A.2.a	2.A.2.a. Determine missing measurements of an angle in a quadrilateral																				
2.A.2.b	2.A.2.b Determine missing measurements of vertical, adjacent, complementary, or supplementary angles.																				
2.C	**2.C. Representation of Geometric Figures**																				
2.C.1	**2.C.1. Represent plane geometric figures to:**																				
2.C.1.a	2.C.1.a. Construct a circle using a given line segment for the radius in whole number inches or centimeters																				
2.C.1.b	2.C.1.b. Construct a line segment congruent to a given line segment																				
2.C.1.c	2.C.1.c. Construct a perpendicular bisector to given line segment or a bisector to a given angle																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
1.C.1.b	1.C.1.b. Create a graph in the coordinate plane using no more than 4 ordered pairs of rational numbers (-20 to 20)																				
1.C.2	**1.C.2. Analyze linear relationships to:**																				
1.C.2.a.	1.C.2.a. Identify a table of values that shows increase, decrease, or no change																				
2.0	**2. Knowledge of Geometry - Students will apply the properties of one -, two -, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects**	***4***	***2***	***1***		***4***	***2***	***1***		***4***	***2***	***1***		***4***	***2***	***1***		***4***	***2***	***1***	
			(1)														***(1)***	***(1)***	***(1)***		
2.A	**2.A. Plane Geometric Figures**																				
2.A.1	**2.A.1. Analyze the properties of plane geometric figures to:**																				
2.A.1.a	2.A.1.a. Identify or describe vertical, adjacent, complementary, or supplementary angles (Use the angle notation m)																				
2.A.2	**2.A.2. Analyze geometric relationships to:**																				
2.A.2.a	2.A.2.a. Determine missing measurements of an angle in a quadrilateral																				
2.A.2.b	2.A.2.b Determine missing measurements of vertical, adjacent, complementary, or supplementary angles.																				
2.C	**2.C. Representation of Geometric Figures**																				
2.C.1	**2.C.1. Represent plane geometric figures to:**																				
2.C.1.a	2.C.1.a. Construct a circle using a given line segment for the radius in whole number inches or centimeters																				
2.C.1.b	2.C.1.b. Construct a line segment congruent to a given line segment																				
2.C.1.c	2.C.1.c. Construct a perpendicular bisector to given line segment or a bisector to a given angle																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
2.D	**2.D. Congruence or Similarity**																				
2.D.1	**2.D.1 Apply the properties of congruent polygons to:**																				
2.D.1.a	2.D.1.a. Find the length of corresponding sides or the measure of corresponding angles using whole numbers (0-1,000)																				
2.E	**2.E. Transformations**																				
2.E.1	**2.E.1. Analyze a transformation on a coordinate plane to:**																				
2.E.1.a	2.E.1.a. Identify or plot the result of one translation (horizontal or vertical), reflection (horizontal or vertical), or rotation around a given point (90^{o} or 180^{o})																				
3.0	**3. Knowledge of Measurement - Students will identify attributes, units, or systems of measurement or apply a variety of techniques, formulas, tools or technology for determining measurements.**	***4***	***1***	***1***	***(1)***	***4***	***1***	***1***	***(1)***	***4***	***1***	***1***		***4***	***1***	***1***	***(1)***	***4***	***1***	***1***	***(1)(1)***
3.C	**3.C. Applications in Measurement**																				
3.C.1	**3.C.1. Estimate or apply formulas to:**																				
3.C.1.a	3.C.1.a. Determine area of parallelograms or trapezoids using whole number dimensions (0-1,000)																				
3.C.1.b	3.C.1.b. Determine surface area of rectangular prisms using whole number dimensions (0-1,000)																				
3.C.2	**3.C.2. Analyze scale drawings to:**																				
3.C.2.a	3.C.2.a Determine a missing length for a polygon with no more than 8 sides using whole numbers (0-1000)																				
3.C.2.b	3.C.2.b. Determine the distance between 2 points using a drawing and a scale of 1 cm = ?, ¼ inch = ?, or ½ inch = ? (0-1,000)																				

Note. Number in parentheses indicates the total number of field test items.

Cod	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
2.D	**2.D. Congruence or Similarity**																				
2.D.1	**2.D.1 Apply the properties of congruent polygons to:**																				
2.D.1.a	2.D.1.a. Find the length of corresponding sides or the measure of corresponding angles using whole numbers (0-1,000)																				
2.E	**2.E. Transformations**																				
2.E.1	**2.E.1. Analyze a transformation on a coordinate plane to:**																				
2.E.1.a	2.E.1.a. Identify or plot the result of one translation (horizontal or vertical), reflection (horizontal or vertical), or rotation around a given point (90^{o} or 180^{o})																				
3.0	**3. Knowledge of Measurement - Students will identify attributes, units, or systems of measurement or apply a variety of techniques, formulas, tools or technology for determining measurements.**	***4 (1)***	***1***		***1***	***4 (1)***	***1***		***1 (1)***	***4 (1)***	***1 (1)***	***1 (1)***	***1 (1)***	***4 (1)***	***1***		***1***	***4 (1)***	***1***		***1 (1)***
3.C	**3.C. Applications in Measurement**																				
3.C.1	**3.C.1. Estimate or apply formulas to:**																				
3.C.1.a	3.C.1.a. Determine area of parallelograms or trapezoids using whole number dimensions (0-1,000)																				
3.C.1.b	3.C.1.b. Determine surface area of rectangular prisms using whole number dimensions (0-1,000)																				
3.C.2	**3.C.2. Analyze scale drawings to:**																				
3.C.2.a	3.C.2.a Determine a missing length for a polygon with no more than 8 sides using whole numbers (0-1000)																				
3.C.2.b	3.C.2.b. Determine the distance between 2 points using a drawing and a scale of 1 cm = ?, ¼ inch = ?, or ½ inch = ? (0-1,000)																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
4.0	**4. Knowledge of Statistics - Students will collect, organize, display, analyze, or interpret data to make decisions or predictions**	***5***	***2***	***1***	***1***	***5***	***2***	***1***	***1***	***5***	***2***	***1***	***1***	***5***	***2***	***1***	***1***	***5***	***2***	***1***	***1***
		(1)	***(1)***		***(1)***	***(1)***			***(1)***	***(2)***			***(1)***	***(1)***			***(1)***	***(1)***			***(1)***
4.A	**4.A. Data Displays**																				
4.A.1	**4.A.1. Organize or display data to:**																				
4.A.1.a	4.A.1.a. Make back-to-back stem-and-leaf plots with no more than 20 data points using whole numbers (0-99)																				
4.B	**4.B. Data Analysis**																				
4.B.1	**4.B.1. Analyze data to:**																				
4.B.1.a	4.B.1.a Recognize or analyze faulty interpretation or representation of data caused by an inappropriate scale or choice of display for a given data set.																				
4.B.1.b	4.B.1.b. Determine the best choice of a data display for a given data set																				
4.B.2	**4.B.2 Analyze measures of central tendency to:**																				
4.B.2.a.	4.B.2.a Determine or apply the mean or median of a given data set with no more than 15 pieces of data or the mode of a given data set with 15-30 pieces of data, using whole numbers or decimals with no more than 2 decimal places (0-100)																				
5.0	**5. Knowledge of Probability - Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.**	***3***	***1***	***1***		***3***	***1***	***1***		***3***	***1***	***1***		***3***	***1***	***1***		***3***	***1***	***1***	
		(2)	***(1)***	***(1)***		***(2)***	***(1)***			***(1)***	***(1)***			***(2)***	***(1)***	***(1)***		***(2)***	***(1)***		
5.A	**5.A. Sample Space**																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
4.0	**4. Knowledge of Statistics - Students will collect, organize, display, analyze, or interpret data to make decisions or predictions**	***5***	***2***	***1***	***1***	***5***	***2***	***1***	***1***	***5***	***2***	***1***	***1***	***5***	***2***	***1***	***1***	***5***	***2***	***1***	***1***
		(1)		***(1)***	***(1)***	***(1)***		***(1)***	***(1)***				***(1)***				***(1)***				***(1)***
4.A	**4.A. Data Displays**																				
4.A.1	**4.A.1. Organize or display data to:**																				
4.A.1.a	4.A.1.a. Make back-to-back stem-and-leaf plots with no more than 20 data points using whole numbers (0-99)																				
4.B	**4.B. Data Analysis**																				
4.B.1	**4.B.1. Analyze data to:**																				
4.B.1.a	4.B.1.a Recognize or analyze faulty interpretation or representation of data caused by an inappropriate scale or choice of display for a given data set.																				
4.B.1.b	4.B.1.b. Determine the best choice of a data display for a given data set																				
4.B.2	**4.B.2 Analyze measures of central tendency to:**																				
4.B.2.a.	4.B.2.a Determine or apply the mean or median of a given data set with no more than 15 pieces of data or the mode of a given data set with 15-30 pieces of data, using whole numbers or decimals with no more than 2 decimal places (0-100)																				
5.0	**5. Knowledge of Probability - Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.**	***3***	***1***	***1***		***3***	***1***	***1***		***3***	***1***	***1***		***3***	***1***	***1***		***3***	***1***	***1***	
															(1)	***(1)***				***(1)***	
5.A	**5.A. Sample Space**																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
5.A.1	**5.A.1. Identify numbers of members of a sample space to:**																				
5.A.1.a	5.A.1.a. Determine the number of outcomes for no more than 3 independent events with a sample space of no more than 6 outcomes in each event																				
5.B	**5.B. Theoretical Probability**																				
5.B.1	5.B.1. Determine the probability of an event comprised of no more than 2 independent events to:																				
5.B.1.a	5.B.1.a Express the probability as a fraction, decimal with no more than 2 decimal places, or percent with a sample space of no more than 35 outcomes.																				
5.C	**5.C. Experimental Probability**																				
5.C.1	**5.C.1. Analyze the results of a survey or simulation to:**																				
5.C.1.a	5.C.1.a. Make predictions and express the probability as a fraction, decimal with no more than 2 decimal places, or percent with 25 or 50 results																				
6.0	**6. Knowledge of Number Relationships or Computation - Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.**	***11***	***3***			***11***	***3***			***11***	***3***			***11***	***3***			***11***	***3***		
		(3)	***(1)***			***(2)***				***(2)***				***(2)***	***(1)***			***(2)***	***(2)***		
6.A	**6.A. Knowledge of Number or Place Value**																				
6.A.1.	**6.A.1. Apply knowledge of rational numbers or place value to:**																				
6.A.1.a	6.A.1.a. Read, write, or represent whole numbers in exponential notation with bases no more than 12 and exponents no more than 3 in standard form (0-1,000)																				
6.A.1.b	6.A.1.b. Express decimals with no more than 4 decimal places using expanded form (0-100)																				
6.A.1.c	6.A.1.c. Determine equivalent forms of fraction, decimals, percents, or ratios using positive rational numbers (0-100)																				

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
5.A.1	**5.A.1. Identify numbers of members of a sample space to:**																				
5.A.1.a	5.A.1.a. Determine the number of outcomes for no more than 3 independent events with a sample space of no more than 6 outcomes in each event																				
5.B	**5.B. Theoretical Probability**																				
5.B.1	**5.B.1. Determine the probability of an event comprised of no more than 2 independent events to:**																				
5.B.1.a	5.B.1.a Express the probability as a fraction, decimal with no more than 2 decimal places, or percent with a sample space of no more than 35 outcomes.																				
5.C	**5.C. Experimental Probability**																				
5.C.1	**5.C.1. Analyze the results of a survey or simulation to:**																				
5.C.1.a	5.C.1.a. Make predictions and express the probability as a fraction, decimal with no more than 2 decimal places, or percent with 25 or 50 results																				
6.0	**6. Knowledge of Number Relationships or Computation - Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.**	***11 (1)***	***3 (3)***			***11 (1)***	***3 (4)***			***11 (2)***	***3 (3)***			***11 (2)***	***3 (2)***			***11 (1)***	***3 (3)***		
6.A	**6.A. Knowledge of Number or Place Value**																				
6.A.1.	**6.A.1. Apply knowledge of rational numbers or place value to:**																				
6.A.1.a	6.A.1.a. Read, write, or represent whole numbers in exponential notation with bases no more than 12 and exponents no more than 3 in standard form (0-1,000)																				
6.A.1.b	6.A.1.b. Express decimals with no more than 4 decimal places using expanded form (0-100)																				
6.A.1.c	6.A.1.c. Determine equivalent forms of fraction, decimals, percents, or ratios using positive rational numbers (0-100)																				

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
6.A.1.d	6.A.1.d Compare, order, or describe no more than 4 fractions with denominators as factors of 300 that are less than 101 (1-100), decimals with no more than 4 decimal places (0-100), percents (0-100), or integers (-100 to 100) with or without using the symbols (<, >, =)																				
6.C	**6.C. Number Computation**																				
6.C.1	**6.C.1. Analyze number relationships or compute to:**																				
6.C.1.a	6.C.1.a. Add, subtract, multiply, or divide integers (Use one operation and -100 to 100)																				
6.C.1.b	6.C.1.b. Add, subtract, or multiply positive fractions or mixed numbers with denominators as factors of 300 less than 101 (use no more than 2 operation and 0-2,000)																				
6.C.1.c	6.C.1.c. Calculate powers using exponents of no more than 3 and bases of whole numbers (0-20) or integers (-10 to 20); square roots of perfect square whole numbers (0-100)																				
6.C.1.d	6.C.1.d. Simplify using the rules of exponents (power x power or power divided by power) with the same whole numbers base (0-100) and exponents (0-10)																				
6.C.1.e	6.C.1.e. Identify or use the commutative property of addition and multiplication, associative property of addition or multiplication, additive inverse property, the distinctive property, or the identity property for one or zero with whole numbers (0-100)																				
6.C.2	**6.C.2. Estimate to:**																				
6.C.2.a	6.C.2.a. Determine the sum, difference, product or quotient of no more than 3 positive rational numbers (0-1,000)																				
6.C.3	**6.C.3. Analyze ratios or percents to:**																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
6.A.1.d	6.A.1.d Compare, order, or describe no more than 4 fractions with denominators as factors of 300 that are less than 101 (1-100), decimals with no more than 4 decimal places (0-100), percents (0-100), or integers (-100 to 100) with or without using the symbols (<, >, =)																				
6.C	**6.C. Number Computation**																				
6.C.1	**6.C.1. Analyze number relationships or compute to:**																				
6.C.1.a	6.C.1.a. Add, subtract, multiply, or divide integers (Use one operation and -100 to 100)																				
6.C.1.b	6.C.1.b. Add, subtract, or multiply positive fractions or mixed numbers with denominators as factors of 300 less than 101 (use no more than 2 operation and 0-2,000)																				
6.C.1.c	6.C.1.c. Calculate powers using exponents of no more than 3 and bases of whole numbers (0-20) or integers (-10 to 20); square roots of perfect square whole numbers (0-100)																				
6.C.1.d	6.C.1.d. Simplify using the rules of exponents (power x power or power divided by power) with the same whole numbers base (0-100) and exponents (0-10)																				
6.C.1.e	6.C.1.e. Identify or use the commutative property of addition and multiplication, associative property of addition or multiplication, additive inverse property, the distinctive property, or the identity property for one or zero with whole numbers (0-100)																				
6.C.2	**6.C.2. Estimate to:**																				
6.C.2.a	6.C.2.a. Determine the sum, difference, product or quotient of no more than 3 positive rational numbers (0-1,000)																				
6.C.3	**6.C.3. Analyze ratios or percents to:**																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
6.C.3.a	6.C.3.a. Determine equivalent ratios with denominators as factors of 300 less than 101 using whole numbers (0-100)																				
6.C.3.b	6.C.3.b. Determine or use rates, unit rates, or percents as ratios in the context of a problem using whole numbers (0-1,000)																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
6.C.3.a	6.C.3.a. Determine equivalent ratios with denominators as factors of 300 less than 101 using whole numbers (0-100)																				
6.C.3.b	6.C.3.b. Determine or use rates, unit rates, or percents as ratios in the context of a problem using whole numbers (0-1,000)																				

Note. Number in parentheses indicates the total number of field test items.

Table D.6 The 2008 MSA-Math Blueprint: Grade 8

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
1.0	**1. Knowledge of Algebra, Patterns, or Functions - Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships.**	***8***	***4***	***2***	***1***	***8***	***4***	***2***	***1***	***8***	***4***	***2***	***1***	***8***	***4***	***2***	***1***	***8***	***4***	***2***	***1***
		(3)	***(2)***	***(1)***		***(1)***	***(1)***	***(1)***		***(3)***	***(1)***	***(1)***		***(2)***		***(1)***	***(1)***	***(2)***	***(1)***		***(1)***
1.A	**1.A. Patterns or Functions**																				
1.A.1	**1.A.1. Identify, describe, extend, or create patterns, functions, or sequences to:**																				
1.A.1.a	1.A.1.a. Determine the nth term no more than 10 terms beyond the last given term using the recursive relationship of arithmetic sequences with common differences no more than 10 (-100 to 5,000)																				
1.A.1.b	1.A.1.b. Determine the nth term no more than 5 terms beyond the last given term using the recursive relationship of geometric sequences with a common whole number ratio of no more than 5:1 (0-10,000)																				
1.A.1.c	1.A.1.c. Determine whether a relationship is linear or non-linear given the graph of the function																				
1.B	**1.B. Expressions, Equations, or Inequalities**																				
1.B.1	**1.B.1. Write, simplify or evaluate expressions to:**																				
1.B.1.a	1.B.1.a. Represent unknown quantities with one unknown and no more than three operations using rational numbers (-1,000 to 1,000)																				
1.B.1.b	1.B.1.b. Determine the value of algebraic expressions with one or two unknowns and up to three operations using rational numbers (-100 to 100)																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
1.0	**1. Knowledge of Algebra, Patterns, or Functions - Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships.**	***8***	***4***	***2***	***1***	***8***	***4***	***2***	***1***	***8***	***4***	***2***	***1***	***8***	***4***	***2***	***1***	***8***	***4***	***2***	***1***
		(3)	***(1)***	***(1)***		***(3)***	***(1)***	***(1)***		***(1)***	***(1)***	***(1)***		***(1)***	***(1)***	***(1)***		***(2)***		***(1)***	***(1)***
1.A	**1.A. Patterns or Functions**																				
1.A.1	**1.A.1. Identify, describe, extend, or create patterns, functions, or sequences to:**																				
1.A.1.a	1.A.1.a. Determine the nth tern no more than 10 terms beyond the last given term using the recursive relationship of arithmetic sequences with common differences no more than 10 (-100 to 5,000)																				
1.A.1.b	1.A.1.b. Determine the nth term no more than 5 terms beyond the last given term using the recursive relationship of geometric sequences with a common whole number ratio of no more than 5:1 (0-10,000)																				
1.A.1.c	1.A.1.c. Determine whether a relationship is linear or non-linear given the graph of the function																				
1.B	**1.B. Expressions, Equations, or Inequalities**																				
1.B.1	**1.B.1. Write, simplify or evaluate expressions to:**																				
1.B.1.a	1.B.1.a. Represent unknown quantities with one unknown and no more than three operations using rational numbers (-1,000 to 1,000)																				
1.B.1.b	1.B.1.b. Determine the value of algebraic expressions with one or two unknowns and up to three operations using rational numbers (-100 to 100)																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
1.B.1.c	1.B.1.c. Determine the value of numeric expressions using order of operations with no more than 5 operations including exponents of no more than 3 and 2 sets of grouping symbols using parentheses, brackets, a division bar, or absolute value with rational numbers (-100 to 100)																				
1.B.1.d	1.B.1.d. Represent equivalent algebraic expressions by combining like terms with no more than 3 variables using whole numbers (-50 to 50) or proper fractions with denominators as factors of 20 (-20 to 20)																				
1.B.2	**1.B.2. Identify, write, or solve equations or inequalities to:**																				
1.B.2.a	1.B.2.a. Represent relationships using a variable by using the appropriate relational symbols (>, ≥, <, ≤, =) and no more than three operational symbols (+, - x, ÷) on either side using rational numbers (-1,000 to 1,000)																				
1.B.2.b	1.B.2.b. Find the unknown in an equation with one unknown on one side used no more than 3 times and up to three operations (same or different but only one division) using rational numbers (-2,000 to 2,000)																				
1.B.2.c	1.B.2.c. Find the unknown in an inequality with one variable on one side used no more than 3 times whose result after combining coefficients is a positive whole number coefficient and one or two operations (-100 to 100)																				
1.B.2.d	1.B.2.d. Identify or graph solutions of inequalities with one variable used once and a positive whole number coefficient on a number line using integers (-100 to 100)																				
1.B.2.e	1.B.2.e. Identify equivalent equations using one unknown no more than 3 times on one side and up to three operations (same or different but only one division) and integers (-2,000 to 2,000)																				
1.B.2.f	1.B.2.f. Apply given formulas having no more than four variables and up to three operations using rational numbers (-500 to 500)																				

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
1.B.1.c	1.B.1.c. Determine the value of numeric expressions using order of operations with no more than 5 operations including exponents of no more than 3 and 2 sets of grouping symbols using parentheses, brackets, a division bar, or absolute value with rational numbers (-100 to 100)																				
1.B.1.d	1.B.1.d. Represent equivalent algebraic expressions by combining like terms with no more than 3 variables using whole numbers (-50 to 50) or proper fractions with denominators as factors of 20 (-20 to 20)																				
1.B.2	**1.B.2. Identify, write, or solve equations or inequalities to:**																				
1.B.2.a	1.B.2.a. Represent relationships using a variable by using the appropriate relational symbols (>, ≥, <, ≤, =) and no more than three operational symbols (+, - x, ÷) on either side using rational numbers (-1,000 to 1,000)																				
1.B.2.b	1.B.2.b. Find the unknown in an equation with one unknown on one side used no more than 3 times and up to three operations (same or different but only one division) using rational numbers (-2,000 to 2,000)																				
1.B.2.c	1.B.2.c. Find the unknown in an inequality with one variable on one side used no more than 3 times whose result after combining coefficients is a positive whole number coefficient and one or two operations (-100 to 100)																				
1.B.2.d	1.B.2.d. Identify or graph solutions of inequalities with one variable used once and a positive whole number coefficient on a number line using integers (-100 to 100)																				
1.B.2.e	1.B.2.e. Identify equivalent equations using one unknown no more than 3 times on one side and up to three operations (same or different but only one division) and integers (-2,000 to 2,000)																				
1.B.2.f	1.B.2.f. Apply given formulas having no more than four variables and up to three operations using rational numbers (-500 to 500)																				

Note. The number in the parenthesis indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
1.C	**1.C. Numeric or Graphic Representations of Relationships**																				
1.C.1	**1.C.1. Locate points on a coordinate plane to:**																				
1.C.1.a	1.C.1.a. Create a graph in the coordinate plane of a linear equation with two unknowns having integers coefficients (-9 to 9) and integer constants (-20 to 20)																				
1.C.2	**1.C.2. Analyze linear relationships to:**																				
1.C.2.a.	1.C.2.a. Determine the slope of a linear relationship having integer coefficients (-9 to 9) and integer constants (-20 to 20), given the graph of the relationship																				
2.0	**2. Knowledge of Geometry - Students will apply the properties of one -, two -, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects**	***5***	***2***			***5***	***2***	***(1)***	***(1)***	***5***	***2***	***(1)***	***(1)***	***(1)***	***5***	***2***	***(1)***	***(2)***	***5***	***2***	***(1)***	***(1)***
2.A	**2.A. Plane Geometric Figures**																				
2.A.1	**2.A.1. Analyze the properties of plane geometric figures to:**																				
2.A.1.a	2.A.1.a. Identify or describe the geometric relationships of alternate interior, alternate exterior, or corresponding angles formed by parallel lines cut by a transversal																				
2.A.1.b	2.A.1.b. Identify or describe the hypotenuse or legs of right triangles																				
2.A.2	**2.A.2. Analyze geometric relationships to:**																				
2.A.2.a	2.A.2.a. Determine the missing measurements of alternate interior, alternate exterior or corresponding angles formed by parallel lines but by a transversal																				
2.A.2.b	**2.A.2.b. Apply the Pythagorean Theorem**																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
1.C	**1.C. Numeric or Graphic Representations of Relationships**																				
1.C.1	**1.C.1. Locate points on a coordinate plane to:**																				
1.C.1.a	1.C.1.a. Create a graph in the coordinate plane of a linear equation with two unknowns having integers coefficients (-9 to 9) and integer constants (-20 to 20)																				
1.C.2	**1.C.2. Analyze linear relationships to:**																				
1.C.2.a.	1.C.2.a. Determine the slope of a linear relationship having integer coefficients (-9 to 9) and integer constants (-20 to 20), given the graph of the relationship																				
2.0	**2. Knowledge of Geometry - Students will apply the properties of one -, two -, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects**	***5***	***2***			***5***	***2***		***(1)***	***5***	***2***		***(1)***	***5***	***2***		***(1)***	***5***	***2***		***(1)***
2.A	**2.A. Plane Geometric Figures**																				
2.A.1	**2.A.1. Analyze the properties of plane geometric figures to:**																				
2.A.1.a	2.A.1.a. Identify or describe the geometric relationships of alternate interior, alternate exterior, or corresponding angles formed by parallel lines cut by a transversal																				
2.A.1.b	2.A.1.b. Identify or describe the hypotenuse or legs of right triangles																				
2.A.2	**2.A.2. Analyze geometric relationships to:**																				
2.A.2.a	2.A.2.a. Determine the missing measurements of alternate interior, alternate exterior or corresponding angles formed by parallel lines but by a transversal																				
2.A.2.b	2.A.2.b. Apply the Pythagorean Theorem																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
2.C	**2.C. Representation of Geometric Figures**																				
2.C.1	**2.C.1. Represent plane geometric figures to:**																				
2.C.1.a	2.C.1.a. Draw quadrilaterals given their whole number dimensions in inches or centimeters or angle measurements																				
2..C.1.b	2.C.1.b. Construct a perpendicular through a given point on a given line segment																				
2.C.1.c	2.C.1.c. Construct a triangle congruent to a given triangle																				
2.D	**2.D. Congruence or Similarity**																				
2.D.1	**2.D.1 Analyze the properties of congruent polygons to:**																				
2.D.1.a	2.D.1.a. Find the length of corresponding sides or the measure of corresponding angles using rational numbers with no more than 2 decimal places (0-1,000)																				
2.E	**2.E. Transformations**																				
2.E.1	**2.E.1. Analyze a transformation on a coordinate plane to:**																				
2.E.1.a	2.E.1.a. Identify or plot the result of two transformation on one figure using translations (horizontal or vertical), reflections (horizontal or vertical), or rotations around a given point (90^{o} or 180^{o})																				
3.0	**3. Knowledge of Measurement - Students will identify attributes, units, or systems of measurement or apply a variety of techniques, formulas, tools or technology for determining measurements.**	***3***	***1***	***1***	***(1)***	***3***	***1***	***1***	***(1)***	***3***	***1***		***(1)***	***3***	***1***	***1***		***3***	***1***	***1***	***(1)***
3.C	**3.C. Applications in Measurement**																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
2.C	**2.C. Representation of Geometric Figures**																				
2.C.1	**2.C.1. Represent plane geometric figures to:**																				
2.C.1.a	2.C.1.a. Draw quadrilaterals given their whole number dimensions in inches or centimeters or angle measurements																				
2..C.1.b	2.C.1.b. Construct a perpendicular through a given point on a given line segment																				
2.C.1.c	2.C.1.c. Construct a triangle congruent to a given triangle																				
2.D	**2.D. Congruence or Similarity**																				
2.D.1	**2.D.1 Analyze the properties of congruent polygons to:**																				
2.D.1.a	2.D.1.a. Find the length of corresponding sides or the measure of corresponding angles using rational numbers with no more than 2 decimal places (0-1,000)																				
2.E	**2.E. Transformations**																				
2.E.1	**2.E.1. Analyze a transformation on a coordinate plane to:**																				
2.E.1.a	2.E.1.a. Identify or plot the result of two transformation on one figure using translations (horizontal or vertical), reflections (horizontal or vertical), or rotations around a given point (90^{o} or 180^{o})																				
3.0	**3. Knowledge of Measurement - Students will identify attributes, units, or systems of measurement or apply a variety of techniques, formulas, tools or technology for determining measurements.**	***3***	***1***		***(1)***	***3***	***1***		***(1)***	***3***	***1***		***(1)***	***3***	***1***		***(1)***	***3***	***1***		***(1)***
3.C	**3.C. Applications in Measurement**																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
3.C.1	**3.C.1. Estimate or apply formulas to:**																				
3.C.1.a	3.C.1.a. Find the circumference or area of a circle using rational numbers with no more than 2 decimal places (0-10,000)																		1		
3.C.1.b	3.C.1.b. Find the area of a composite figure with no more than six polygons (triangles, rectangles, or circles) by measuring, partitioning, or using formulas with whole number dimensions (0-10,000)																				
3.C.1.c	3.C.1.c. Find the volume of a cylinder with whole number dimensions, given the formula (0-10,000)																				
3.C.2	**3.C.2. Analyze measurement relationships to:**																				
3.C.2.a	3.C.2.a. Solve problems using proportions, scale drawings with scales as whole numbers, or rates using whole numbers or decimals (0-1,000)																				
4.0	**4. Knowledge of Statistics - Students will collect, organize, display, analyze, or interpret data to make decisions or predictions**	***6***	***1***	***1***	***1 (1)***	***6***	***1***	***1***	***1 (1)***	***6***	***1***	***1***	***1 (1)***	***6 (2)***	***1***	***1 (1)***	***1 (1)***	***6 (1)***	***1***	***1***	***1 (1)***
4.A	**4.A. Data Displays**																				
4.A.1	**4.A.1. Organize and display data to:**																				
4.A.1.a	4.A.1.a. Make circle graphs with no more than 5 categories using data in whole number percents																				
4.A.1.b	4.A.1.b. Make box-and-whisker plots with no more than 12 pieces of data using whole numbers (0-1,000)																				
4.A.1.c	4.A.1.c. Make scatter plots with no more than 10 points using whole numbers (0-1,000)																				
4.B	**4.B. Data Analysis**																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
3.C.1	**3.C.1. Estimate or apply formulas to:**																				
3.C.1.a	3.C.1.a. Find the circumference or area of a circle using rational numbers with no more than 2 decimal places (0-10,000)																				
3.C.1.b	3.C.1.b. Find the area of a composite figure with no more than six polygons (triangles, rectangles, or circles) by measuring, partitioning, or using formulas with whole number dimensions (0-10,000)																				
3.C.1.c	3.C.1.c. Find the volume of a cylinder with whole number dimensions, given the formula (0-10,000)																				
3.C.2	**3.C.2. Analyze measurement relationships to:**																				
3.C.2.a	3.C.2.a. Solve problems using proportions, scale drawings with scales as whole numbers, or rates using whole numbers or decimals (0-1,000)																				
4.0	**4. Knowledge of Statistics - Students will collect, organize, display, analyze, or interpret data to make decisions or predictions**	***6 (1)***	***1 (1)***	***1 (1)***	***1 (1)***	***6 (1)***	***1***	***1***	***1 (1)***	***6***	***1***	***1***	***1 (1)***	***6***	***1***	***1***	***1 (1)***	***6 (1)***	***1 (1)***	***1***	***1 (1)***
4.A	**4.A. Data Displays**																				
4.A.1	**4.A.1. Organize and display data to:**																				
4.A.1.a	4.A.1.a. Make circle graphs with no more than 5 categories using data in whole number percents																				
4.A.1.b	4.A.1.b. Make box-and-whisker plots with no more than 12 pieces of data using whole numbers (0-1,000)																				
4.A.1.c	4.A.1.c. Make scatter plots with no more than 10 points using whole numbers (0-1,000)																				
4.B	**4.B. Data Analysis**																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
4.B.1	**4.B.1. Analyze data to:**																				
4.B.1.a	4.B.1.a. Interpret tables with no more than 5 categories having no more than 2 quantities per category using whole numbers or decimals with no more than 2 decimal places (0-100)																				
4.B.1.b	4.B.1.b. Interpret box-and-whisker plots using minimum, first (lower) quartile, median (middle) quartile, third (upper) quartile, or maximum using whole numbers (0-100)																				
4.B.1.c	4.B.1.c. Interpret scatter plots with no more than 10 points using whole numbers or decimals with no more than 2 decimal places (0-100)																				
4.B.1.d	4.B.1.d. Interpret circle graph with no more than 8 categories (0-1,000)																				
5.0	**5. Knowledge of Probability - Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.**	***2***	***2***	***1***	***(1)***	***2***	***2***	***1***	***(1)***	***2***	***2***	***1***	***(1)***	***2***	***2***	***1***	***(1)***	***2***	***2***	***1***	
5.A	**5.A. Sample Space**																				
5.A.1	**5.A.1. Identify number of members of a sample space to:**																				
5.A.1.a	5.A.1.a. Determine the number of outcomes for no more than 5 dependent events with no more than 10 outcomes in the first event.																				
5.B	**5.B. Theoretical Probability**																				
5.B.1	**5.B.1. Determine the probability of an event comprised of no more than 2 independent events to:**																				
5.B.1.a	5.B.1.a. Express the probability as a fraction, decimal or percent with a sample space of no more than 36-60 outcomes																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
4.B.1	**4.B.1. Analyze data to:**																				
4.B.1.a	4.B.1.a. Interpret tables with no more than 5 categories having no more than 2 quantities per category using whole numbers or decimals with no more than 2 decimal places (0-100)																				
4.B.1.b	4.B.1.b. Interpret box-and-whisker plots using minimum, first (lower) quartile, median (middle) quartile, third (upper) quartile, or maximum using whole numbers (0-100)																				
4.B.1.c	4.B.1.c. Interpret scatter plots with no more than 10 points using whole numbers or decimals with no more than 2 decimal places (0-100)																				
4.B.1.d	4.B.1.d. Interpret circle graph with no more than 8 categories (0-1,000)																				
5.0	**5. Knowledge of Probability - Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.**	***2***	***2***	***1***		***2***	***2***	***1***	***(1)***	***2***	***2***	***1***	***(1)***	***2***	***2***	***1***	***(1)***	***2***	***2***	***1***	
5.A	**5.A. Sample Space**																				
5.A.1	**5.A.1. Identify number of members of a sample space to:**																				
5.A.1.a	5.A.1.a. Determine the number of outcomes for no more than 5 dependent events with no more than 10 outcomes in the first event.																				
5.B	**5.B. Theoretical Probability**																				
5.B.1	**5.B.1. Determine the probability of an event comprised of no more than 2 independent events to:**																				
5.B.1.a	5.B.1.a. Express the probability as a fraction, decimal or percent with a sample space of no more than 36-60 outcomes																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
5.B.2	**5.B.2. Determine the probability of second event that is dependent on a first event of equally likely outcomes to:**																				
5.B.2.a	5.B.2.a. Express the probability as a fraction, decimal, or percent with a sample space of no more than 60 outcomes																				
5.C	**5.C. Experimental Probability**																				
5.C.1	**5.C.1. Analyze the results of a survey or simulation to:**																				
5.C.1.a	5.C.1.a. Make predictions and express the probability as a fraction, decimal with no more than 2 decimal places, or percent with 20-500 results																				
6.0	**6. Knowledge of Number Relationships or Computation - Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.**	***10***	***2***			***10***	***2***			***10***	***2***			***10***	***2***			***10***	***2***		
		(2)	***(1)***			***(3)***	***(1)***			***(2)***	***(1)***			***(1)***	***(1)***			***(2)***	***(2)***		
6.A	**6.A. Knowledge of Number or Place Value**																				
6.A.1.	**6.A.1. Apply knowledge of rational numbers or place value to:**																				
6.A.1.a	6.A.1.a. Read, write, or represent rational numbers in exponential notation or scientific notation (-10,000 to 1,000,000,000)																				
6.A.1.b	6.A.1.b. Compare, order, or describe no more than 4 integers (-100 to 100) or positive rational numbers (0-100) using equivalent forms or absolute value with or without using the symbols (<, >, =)																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
5.B.2	**5.B.2. Determine the probability of second event that is dependent on a first event of equally likely outcomes to:**																				
5.B.2.a	5.B.2.a. Express the probability as a fraction, decimal, or percent with a sample space of no more than 60 outcomes																				
5.C	**5.C. Experimental Probability**																				
5.C.1	**5.C.1. Analyze the results of a survey or simulation to:**																				
5.C.1.a	5.C.1.a. Make predictions and express the probability as a fraction, decimal with no more than 2 decimal places, or percent with 20-500 results																				
6.0	**6. Knowledge of Number Relationships or Computation - Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.**	***10 (2)***	***2 (2)***			***10 (1)***	***2 (2)***			***10 (3)***	***2 (2)***			***10 (2)***	***2 (2)***			***10 (2)***	***2 (2)***		
6.A	**6.A. Knowledge of Number or Place Value**																				
6.A.1.	**6.A.1. Apply knowledge of rational numbers or place value to:**																				
6.A.1.a	6.A.1.a. Read, write, or represent rational numbers in exponential notation or scientific notation (-10,000 to 1,000,000,000)																				
6.A.1.b	6.A.1.b. Compare, order, or describe no more than 4 integers (-100 to 100) or positive rational numbers (0-100) using equivalent forms or absolute value with or without using the symbols (<, >, =)																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form A)				No. of Augmented Items (Form B)				No. of Augmented Items (Form C)				No. of Augmented Items (Form D)				No. of Augmented Items (Form E)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
6.C	**6.C. Number Computation**																				
6.C.1	**6.C.1. Analyze number relationships or compute to:**																				
6.C.1.a	6.C.1.a. Add, subtract, multiply, or divide integers using one operation (-1,000 to 1,000)																				
6.C.1.b	6.C.1.b. Calculate powers using bases no more than 12 and exponents no more than 3 or square roots of perfect squares no more than 144																				
6.C.1.c	6.C.1.c. Simplify using the rules of exponents (power x power or power divided by power) with the same integer as a base (-20 to 20) and exponents (0-10)																				
6.C.1.d	6.C.1.d Identify or use the commutative property of addition and multiplication, associative property of addition or multiplication, additive inverse property, the distributive property, or the identity property for one or zero with integers (-100 to 100)																				
6.C.2	**6.C.2. Estimate to:**																				
6.C.2.a	6.C.2.a. Determine square roots of whole numbers (0-100)																				
6.C.3	**6.C.3. Analyze ratios, proportions, or percents to:**																				
6.C.3.a	6.C.3.a. Determine unit rates using positive rational numbers (0-100)																				
6.C.3.b	6.C.3.b. Determine or use percents, rate of increase/decrease, discount, commission, sales tax, or simple interest in the context of a problem using positive rational numbers (0-10,000)																				
6.C.3.c	6.C.3.c. Use proportional reasoning to solve problems using positive rational numbers (0-1,000)																				

Note. Number in parentheses indicates the total number of field test items.

Code	Standard / Objective Statement	No. of Augmented Items (Form F)				No. of Augmented Items (Form G)				No. of Augmented Items (Form H)				No. of Augmented Items (Form J)				No. of Augmented Items (Form K)			
		SR	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*	*SR*	*SPR*	*BCR*	*ECR*
6.C	**6.C. Number Computation**																				
6.C.1	**6.C.1. Analyze number relationships or compute to:**																				
6.C.1.a	6.C.1.a. Add, subtract, multiply, or divide integers using one operation (-1,000 to 1,000)																				
6.C.1.b	6.C.1.b. Calculate powers using bases no more than 12 and exponents no more than 3 or square roots of perfect squares no more than 144																				
6.C.1.c	6.C.1.c. Simplify using the rules of exponents (power x power or power divided by power) with the same integer as a base (-20 to 20) and exponents (0-10)																				
6.C.1.d	6.C.1.d Identify or use the commutative property of addition and multiplication, associative property of addition or multiplication, additive inverse property, the distributive property, or the identity property for one or zero with integers (-100 to 100)																				
6.C.2	**6.C.2. Estimate to:**																				
6.C.2.a	6.C.2.a. Determine square roots of whole numbers (0-100)																				
6.C.3	**6.C.3. Analyze ratios, proportions, or percents to:**																				
6.C.3.a	6.C.3.a. Determine unit rates using positive rational numbers (0-100)																				
6.C.3.b	6.C.3.b. Determine or use percents, rate of increase/decrease, discount, commission, sales tax, or simple interest in the context of a problem using positive rational numbers (0-10,000)																				
6.C.3.c	6.C.3.c. Use proportional reasoning to solve problems using positive rational numbers (0-1,000)																				

Note. Number in parentheses indicates the total number of field test items.