Alabama Reading and Mathematics Test

Item Specifications

for

Mathematics Grade 4



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INTRODUCTION

This bulletin provides specific information about the *Alabama Reading and Mathematics Test* (ARMT). Educators representing each State Board of Education district as well as both city and county school systems served on committees to determine the content standards on which the ARMT is based. In addition, educators from throughout the state of Alabama served on committees to review the content of the tests, including selecting and reviewing specific mathematics test items, and determining achievement levels.

Teachers must be familiar with the information in this bulletin so that they may incorporate effective teaching of the mathematics content standards with classroom assessments. Using classroom assessments with similar test formats from time to time will help to enable students to demonstrate proficiency on the various content standards in mathematics.

Three item types are included in the ARMT. Multiple-choice, gridded, and open-ended items assess student performance on the ARMT in mathematics. Multiple-choice items and gridded items carry a point value of one, while open-ended items carry a point value of three. In this document, teachers will see representative item types for each mathematics content standard.

Content Standard	A statement of what students should know and be able to do by the end of the academic year
Item Type	Multiple-choice, gridded, open-ended items
Additional Information	Further information about the test items for the content standard
Sample Items	A collection of item types for each content standard
Answer Key	Answers for multiple-choice and gridded items
Scoring Rubrics for Open-Ended Items	Scoring guide for open-ended items

CONTENT STANDARDS Grade 4

CONTENT STANDARD	POINTS POSSIBLE	
Number and Operations	4	
and whole numbers to 999,999.	4	
2- Write money amounts in words and dollar-and-cent notation.	3	
3- Rename improper fractions as mixed numbers and mixed numbers as improper fractions.	3	
4- Demonstrate addition and subtraction of fractions with common denominators.	4	
5- Round whole numbers to the nearest ten, hundred or thousand and decimals to the nearest tenth.	4	
6- Solve problems, including word problems, that involve addition and subtraction of four-digit numbers with and without regrouping.	7	
7- Solve problems, including word problems, involving the basic operations of multiplication and division on whole numbers through two-digit multipliers and one-digit divisors.	7	
8- Recognize equivalent forms of commonly used fractions and decimals.	4	
	36	
Algebra		
9- Write number sentences for word problems that involve multiplication or division.	4	
10- Complete addition and subtraction number sentences with a missing addend or	4	
subtrahend.	8	
Geometry		
11- Identify triangles, quadrilaterals, pentagons, hexagons, or octagons based on the number of sides, angles, and vertices.	4	
12- Find locations on a map or a grid using ordered pairs.	<u>4</u>	
	8	
Measurement	2	
13- Calculate elapsed time in nours and minutes.	5	
14- Measure length, width, weight, and capacity using metric and customary units, and temperature in degrees Fahrenheit and degrees Celsius.	<u>6</u> 9	

Data Analysis and Probability	
15- Represent categorical data using tables and graphs, including bar graphs, line graphs, and line plots.	4
16- Determine if outcomes of simple events are likely, unlikely, certain, equally likely, or impossible.	3
17- Represent numerical data using tables and graphs including bar graphs and line graphs.	<u>4</u>
	11
TOTAL POINTS POSSIBLE	72

ITEMS BY CONTENT STANDARD

DIRECTIONS (These are the directions given to students.)

Read the problem and find the answer.

If the problem has a multiple-choice answer, darken the bubble in the correct space in your answer document.

If the problem has an answer grid:

- Write your answer in the boxes at the top of the grid.
- Darken the correct bubble of the number or symbol in the column below.
- If your answer is a repeating decimal, round to the nearer hundredth.

For the problems that ask you to show your work, use the space given in your answer document.

- Be sure to show all your work or explain how you got your answer in the space given.
- If you use your calculator to get your answer, explain the steps you take.

For all problems, be sure to check your answers.

NUMBER AND OPERATIONS

Content Standard 1

Demonstrate number sense by comparing and ordering decimals to hundredths and whole numbers to 999,999.

Item Type

Multiple-choice

Additional Information

In comparing numbers, *larger*, *greater than*, *less than*, or *equal to* may be used (symbols or words). In ordering numbers, *first*, *second*, *third*, etc., may be used. In ordering numbers, *greatest* to *least*, *least* to *greatest*, *longest* to *shortest*, or *shortest* to *longest* may be used. In ordering numbers, arranging numbers may be used. Tables and charts may be used. Word problems/real-life situations may be used. Money values may be used.

Sample Multiple-Choice Items

1. Fiona measured the lengths of five different boards. The lengths were 1.73 meters, 3.14 meters, 2.05 meters, 3.51 meters, and 0.98 meters.

Which of the following lists the lengths of the boards in order from *shortest* to *longest*?

A 0.98 meters, 1.73 meters, 3.51 meters, 3.14 meters, 2.05 meters

- **B** 1.73 meters, 2.05 meters, 3.14 meters, 0.98 meters, 3.51 meters
- C 0.98 meters, 1.73 meters, 2.05 meters, 3.14 meters, 3.51 meters*
- D 2.05 meters, 3.14 meters, 3.51 meters, 1.73 meters, 0.98 meters

2. Phillip measured four lines using his inch ruler.

Which of the following lists shows the lengths of the line segments in order from *greatest* to *least*?

- **A** 1.09, 1.26, 0.56, 0.71
- **B** 0.56, 0.71, 1.09, 1.26
- C 1.26, 1.09, 0.71, 0.56*
- **D** 1.26, 0.56, 1.09, 0.71

	ng suppres	
Item	Price	
Bait	\$2.99	
Fish finder	\$279.99	
Fishing rod	\$11.99	
Hooks	\$6.99	
Spinning reel	\$39.99	
	ItemBaitFish finderFishing rodHooksSpinning reel	ItemPriceBait\$2.99Fish finder\$279.99Fishing rod\$11.99Hooks\$6.99Spinning reel\$39.99

- **C** \$2.99, \$11.99, \$6.99, \$39.99, \$279.99
- **D** \$279.99, \$39.99, \$11.99, \$6.99, \$2.99

4. The weights of different sharks found in an ocean are listed in the chart below.

Shark Weights

Type of Shark	Weight (in Pounds)	
Gray Nurse	1204	
Greenland	2143	
Mako	1147	
Six-gill	1294	
Thresher	1045	
Tiger	1789	

Which types of sharks found in the ocean each weighed *less than* 1200 pounds?

- A Thresher and Mako*
- **B** Thresher and Gray Nurse
- C Gray Nurse and Six-gill
- **D** Mako and Six-gill

5. The distance Talia and each of her friends jumped during a standing broad jump contest is listed in the chart below.

Standing Broad Jump			
Student	Number of		
	Meters Jumped		
Amber	1.90		
Brent	2.14		
Marques	2.04		
Talia	1.92		

Which list shows the students in order from the *greatest* distance jumped to the *least* distance jumped?

- A Amber, Talia, Marques, Brent
- **B** Amber, Talia, Brent, Marques
- C Brent, Marques, Amber, Talia
- D Brent, Marques, Talia, Amber*

6. The area of several different lakes in a county is shown in the chart below.

Area of Lakes

Laka	Area	
Lake	(in square feet)	
Clarksville	12,599	
Holmes	12,148	
Johnson	13,045	
Kendall	12,094	
Millerton	12,709	

Which lake on the chart has an area between 12,675 and 13,000 square feet?

- A Clarksville
- **B** Holmes
- C Johnson
- **D** Millerton*

7. The average number of goals scored by different soccer players is listed in the chart.

Average Goals Scored

Person	Average Number of Goals Scored
Jake	1.42
Lisa	1.24
Melissa	2.40
Nate	2.04

In which list are the averages in order from *least* to *greatest*?

- **A** 1.24, 1.42, 2.40, 2.04 **B** 1.24, 1.42, 2.04, 2.40*
- C 2.04, 1.24, 2.40, 1.42
- **D** 2.40, 2.04, 1.42, 1.24

8. The members of the glee club are selling pins for the football game. They made this chart to show the number of boxes of pins sold by different members.

Pins for Football Game

Member	Number of Boxes of Pins Sold	
Allyson	1.39	
Brad	1.93	
Joaquin	2.92	
Trent	2.30	

Which lists the members in order from the *least* number of boxes sold to the *greatest* number of boxes sold?

- A Allyson, Brad, Trent, Joaquin*
- **B** Allyson, Brad, Joaquin, Trent
- C Joaquin, Trent, Brad, Allyson
- D Joaquin, Trent, Allyson, Brad

Answer Key

Content Standard 1

Sample Multiple-Choice

1. C

2. C

3. B

4. A 5. D

5. D 6. D

7. B

8. A

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NUMBER AND OPERATIONS

Content Standard 2

Write money amounts in words and dollar-and-cent notation.

Item Type

Multiple-choice Gridded

Additional Information

Word problems/real-life situations may be used. Symbols for dollars and cents will be used.

Sample Multiple-Choice Items

1. Carrie paid \$6.99 for a book.

Which of these is the same as \$6.99?

- A Six dollars and ninety cents
- **B** Sixteen dollars and ninety cents
- C Six dollars and ninety-nine cents*
- **D** Sixty-nine dollars and nine cents

2. William bought a model car. The car cost \$59.73.

Which of the following shows the amount written in word form?

- A Fifty-nine dollars and seventythree cents*
- **B** Five hundred ninety dollars and seventy-three cents
- C Fifty dollars and seventy-three cents
- **D** Five dollars and seventy-three cents

3. Cynthia's dad earned \$40,444.40 last year.

Which of the following is the same as \$40,444.40?

- A Four thousand, four hundred forty-four dollars and forty cents
- **B** Four million, four hundred forty-four dollars and forty cents
- C Four hundred thousand, four hundred forty dollars and forty cents
- **D** Forty thousand, four hundred forty-four dollars and forty cents*

4. Samuel has coins worth \$2.12 in his pocket.

Which of the following shows the value of \$2.12?

- A Twelve cents
- **B** Two dollars and two cents
- C Two dollars and twelve cents*
- **D** Twelve dollars and two cents

Sample Gridded Items

1. Jermaine has three dollars in paper money. He has twenty-two cents in coins.

How much money does Jermaine have altogether?

Mark your answer in the answer grid.

3. The land sold during the Gold Rush cost one dollar and sixtythree cents per acre.

> What is one dollar and sixtythree cents written in numerical form?

Mark your answer in the answer grid.

2. Candace paid fifty-seven cents for lemonade.

What is this amount written in numerical form?

Mark your answer in the answer grid.

4. The price of a DVD player is one hundred fifty-six dollars and seventy-eight cents.

What value should be written on the price tag?

Mark your answer in the answer grid.

Answer Key

Content Standard 2

Sample Multiple-Choice 1. C

2. A

3. D

4. C

Sample Gridded

 1. \$3.22

 2. \$0.57

3. \$1.63

4. \$156.78

NUMBER AND OPERATIONS

Content Standard 3

Rename improper fractions as mixed numbers and mixed numbers as improper fractions.

Item Type

Multiple-choice

Additional Information

Use reasonable denominators less than 100. Word problems/real-life situations may be used.

Sample Multiple-Choice Items



2. Which of the following has the same value as $1\frac{3}{5}$?			
$\frac{\frac{8}{5}}{\mathbf{A^*}}$	$\frac{5}{8}$ B	$\frac{5}{3}$ C	$\frac{6}{5}$ D



5. Which is $\frac{5}{3}$ written as a mixed number?				
$1\frac{2}{3}$ A *	$5\frac{1}{3}$ B	$1\frac{1}{3}$ C	$5\frac{2}{3}$ D	

4. Roberto solved a puzzle in $4\frac{1}{2}$ hours.						
	Which of the following is equivalent to $4\frac{1}{2}$?					
$\frac{5}{2}$	$ \frac{5}{2} \qquad \frac{8}{2} \qquad \frac{9}{2} \qquad \frac{41}{2} \\ A \qquad B \qquad C* \qquad D $					

Answer Key

Content Standard 3

Sample Multiple-Choice

1. D

2. A

3. B

4. C

5. A

NUMBER AND OPERATIONS

Content Standard 4

Demonstrate addition and subtraction of fractions with common denominators.

Item Type

Multiple-choice

Additional Information

Word problems/real-life situations may be used. Use reasonable denominators less than 100. Reducing fractions will not be required.

Sample Multiple-Choice Items

1. $\frac{3}{5}$ +	$\frac{1}{5} = \square$		
$\frac{4}{5}$ A*	$\frac{4}{10}$ B	$\frac{3}{5}$ C	$\frac{3}{10}$ D

2.	Cecili broth pizza. What left af broth	a ate $\frac{1}{4}$ er ate $\frac{2}{4}$ fraction ter Ceci er ate?	of a pizza of the sa of the pi llia and he	ı. Her me zza was er
ŀ	$\frac{1}{4}$	$\frac{2}{4}$ B	$\frac{3}{4}$ C	$\frac{4}{4}$ D



5. $\frac{8}{9}$ -	$\frac{3}{9} = \square$		
$\frac{5}{18}$ A	5 9 B *	$\frac{11}{18}$ C	$\frac{11}{9}$ D

4. On Monday, Jacob started reading his book. On Monday, he read $\frac{9}{20}$ of his book. On Tuesday, he read $\frac{5}{20}$ of his book. How much more did Jacob read on Monday than on **Tuesday?** 14 9 4 4 $\overline{10}$ 20 20 20 А B **C*** D

Answer Key

Content Standard 4

Sample Multiple-Choice

1. A

2. A

3. D

4. C

5. B

NUMBER AND OPERATIONS

Content Standard 5

Round whole numbers to the nearest ten, hundred, or thousand and decimals to the nearest tenth.

Item Type

Multiple-choice Gridded

Additional Information

Word problems/real-life situations may be used. Money values may be used.

Sample Multiple-Choice Items

1. The Colorado River is 1387 kilometers in length. What is 1387 rounded to the

nearer hundred?

1300	1390	1400	1380
Α	В	C*	D

3. Jess and 23.0 Wh	sica measu l found its 64 inches. at is 23.64	ured her f length to rounded	ish tank be to the
пса			
23.0 A	23.6 B *	23.7 C	24.0 D

2.	Mr. Mason's 14,391 cans t	class collected to recycle.		
	What is 14,391 rounded to the nearer ten?			
A	14,000	C 14,400		

4.	. Mr. Fisher has \$4551 in his bank account.					
	What is \$4551 rounded to the nearer thousand dollars?					
Α	\$4000	С	\$4600			
B	\$4550	D	\$5000*			

5.	What is 15,8 nearer thous	91 rounded to the and?
A B	16,000* 15,900	C 15,890D 15,000

Sample Gridded Items

1. Samuel's keyboard is 45.6 centimeters wide.

What is 45.6 rounded to the nearer ten?

Mark your answer in the answer grid.

3. There are 2475 air miles between New York City and Los Angeles.

What is 2475 rounded to the nearer hundred?

Mark your answer in the answer grid.

2. A bag of birdseed weighs 4.28 pounds.

What is 4.28 rounded to the nearer tenth?

Mark your answer in the answer grid.

4. The wingspan of a bird in a museum is 189.49 centimeters.

What is 189.49 rounded to the nearer tenth?

Mark your answer in the answer grid.

Answer Key

Content Standard 5

Sample Multiple-Choice

1. C

2. B

3. B

4. D

5. A

Sample Gridded

1.50

2.4.3

3.2500

4.189.5

NUMBER AND OPERATIONS

Content Standard 6

Solve problems, including word problems, that involve addition and subtraction of four-digit numbers with and without regrouping.

Item Type

Multiple-choice Gridded Open-ended

Additional Information

Word problems/real-life situations may be used. Tables may be used only for graphic organization of information. Fractions will not be used. Multiple steps may be used. Money values may be used. One of the options may be NH, which means "Not Here."

Sample Multiple-Choice Items



2.	4879 + 385	
A	5254	C 5264*
В	5263	D NH



4.	4. Jefferson Elementary School has 1132 students. Adams Elementary School has 1370 students.					
	How many more students does Adams Elementary School have than Jefferson Elementary School?					
2	238 A *	248 B	262 C	362 D		



Sample Gridded Items

1. The worker at a ticket office sold 4920 tickets for the Thursday performance of a play and 3879 for the Friday performance.

> How many more tickets were sold for the Thursday performance than for the Friday performance?

Mark your answer in the answer grid.

3. The fourth-grade wing on the new elementary school has 8998 square feet of area. The fifth-grade wing has 9220 square feet of area.

> How much larger, in square feet, is the fifth-grade wing than the fourth-grade wing?

Mark your answer in the answer grid.

2. Mr. Thomas sold ice cream over the weekend. On Saturday he earned \$102.42 and on Sunday he earned \$107.59.

> In all, how much money did Mr. Thomas earn over the weekend?

Mark your answer in the answer grid.

4. Jacob went to the store to buy some clothes. He purchased a shirt for \$17.27 and a pair of pants for \$32.39.

How much did Jacob spend in all?

Mark your answer in the answer grid.

Sample Open-Ended Items

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

1. Use the chart below to answer the following question.

Tall Buildings in the United States

Building and City	Height (in feet)
Chrysler Building, New York	1046
Empire State Building, New York	1250
John Hancock Center, Chicago	1127
Sears Tower, Chicago	1450

How much greater is the combined height of the buildings in Chicago than the combined height of the buildings in New York?

Show all your work and/or explain your reasoning in the space provided in the answer document.

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

- 2. Jo and Ella are planning a vacation from their home in Anniston to Orlando and Washington DC. The distance from Anniston to Orlando is 529 miles and from Anniston to Washington DC is 728 miles. It is 852 miles from Washington DC to Orlando.
 - a. If Ella and Jo go from their home in Anniston to Washington DC, then go on to Orlando, and from Orlando return home, how miles would they go?
 - b. If Ella and Jo plan a shorter vacation going from their home in Anniston to Washington DC, then return home, how many *fewer* miles would they go?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

3. The age and ratings of several different members of a chess club are listed in the table below.

Chess Ratings		
Member	Age	Rating
Everett	34	2436
Jonathon	16	1822
Kelli	19	1902
Linda	26	2248
Marquis	18	1810
Roberto	28	2032

- a. What is the difference between Jonathon and Everett's ratings?
- b. What is the difference between Marquis and Linda's ratings?
- c. If you compare the total ratings of the members under 20 years of age to the total ratings over 20 years of age, which age group has a higher rating, and how much higher?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

4. The points earned by several different track-and-field athletes are listed in the chart below.

Decatifion Results		
Athlete	Points	
Mark Smith	8750	
Paul Witherspoon	7503	
Roman Andre	8634	

Decathlon Results

- a. What is the difference between the total points earned by Mark Smith and Paul Witherspoon?
- b. How many more points would Roman Andre need to equal the number Mark Smith had?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.
This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

5. The deepest point in several different lakes is listed in the chart below.
Depth of Lakes
Demost Deint

Lake	Deepest Point (in feet)
Crater	1932
Malawi	2316
Tahoe	1657
Toba	1736

- a. What is the difference between the deepest point in Lake Malawi and Lake Tahoe?
- **b.** Both Crater Lake and Lake Tahoe are in the United States. What is the difference between the deepest point of these two lakes?
- c. A lake in Russia is more than 2 times as deep as Lake Toba. What could be the deepest point in the lake in Russia?

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

6. The total number of votes two candidates received in two different cities is listed in the table below.

City	Candidate	Total Votes
Elmhurst	Henry	6697
Elmhurst	Williamson	6419
Wallisville	Henry	6210
Wallisville	Williamson	7904

Votes for Candidate

- a. What is the difference between the total votes Williamson and Henry received in Elmhurst?
- b. What is the difference between the total votes Williamson and Henry received in Wallisville?
- c. Which candidate received the most votes in the 2 cities combined?

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

7. Billy is making a table of miles traveled by former students. The names of four former students attending a high school reunion, the total number of miles flown, and states crossed over in the airplane are listed in the table below.

ingi School Reunion Dutu					
Former Student	Miles Flown	States Crossed			
Jamal Billis	714	4			
Lisa Moore	523	3			
Ollie Flynn	349	3			
Paul Winter	1429	7			

High	School	Reunion	Data
IIIGH	SCHOOL	IXCUIIIOII	Data

- a. What is the difference between the *total* miles flown by Paul Winter and Jamal Billis?
- b. What is the *total* number of miles flown by Paul Winter and Jamal Billis?
- c. Billy thinks the *total* number of miles flown by former students who crossed *exactly* 3 states will be greater than the *total* number of miles flown by students crossing *more than* 3 states. Do you agree with Billy?

Answer Key

Content Standard 6

Sample Multiple-Choice
1. B
2. C
3. D

4. A

5. D

Sample Gridded

1.1041

2. \$210.01

3. 222

4. \$49.66

Sample Open-Ended

1. Sample Response(s): New York: 1046 + 1250 = 2296 feet Chicago: 1127 + 1450 = 2577 feet 2577 - 2296 = 281 feet OR I added the buildings in New York to get 2296 feet. Then I added the buildings in Chicago to get 2577 feet. Next, I subtracted 2296 from 2577 and got 281. The buildings in Chicago are 281 feet taller than the buildings in New York. OR I used a calculator to add the buildings in Chicago. Then I added the buildings in New York. Next, I subtracted the two numbers to get 281 feet. Score Point **Response Attributes** All is correct. 3 All logics or explanations are correct. 2 OR Two logics and two or three answers are correct. One or more answers to problems are correct. 1 AND/OR One or two logics are correct. None correct. (Also, blanks, rewrites problem, foreign language, illegible, 0 refusals, off task, etc., scored as invalid.)

a. 728 + 852 + 529 = 2109

OR I used a calculator and added all three numbers to get 2109.

b. 2109 - 2(728) = 653 **OR**

Since it is 728 miles from Anniston to Washington DC, I added 728 twice to get 1456 miles. Then I took the answer in part **a**, and subtracted 1456 from 2109 to get 653 fewer miles.

OR

I used my calculator to add the miles from Anniston to Washington DC 2 times. Then, I subtracted that number from part **a**. They would go 653 fewer miles.

Score Point	Response Attributes
3	All is correct.
	All logics or explanations are correct.
2	OR
	Two logics and two or three answers are correct.
	One or more answers to problems are correct.
1	AND/OR
	One or two logics are correct.
0	None correct. (Also, blanks, rewrites problem, foreign language, illegible,
U	refusals, off task, etc., scored as invalid.)

a. Jonathe	ion and Everett's ratings are 614 apart. $(2436 - 1822 = 614)$				
b. Marqu	b. Marquis and Linda's ratings are 438 apart. $(2248 - 1810 = 438)$				
c. I used a ratings 6717 w I adde I adde Then t of 118	c. I used my calculator to solve the problem. The members under the age of 20 have ratings that total 5534. The over 20s have a higher rating. The over 20's rating is 6717 which is 1182 points higher than the under 20's rating. OR I added the under 20s of $1822 + 1902 + 1810 = 5534$. I added the over 20s of $2436 + 2248 + 2032 = 6716$. Then to compare, I subtracted the two numbers of $6716 - 5534$ to get a difference of 1182 points. The over 20s have the higher rating by 1182 points.				
Score Point	Response Attributes				
3	All is correct.				
2	2 All logics or explanations are correct. OR Two logics and at least three answers are correct.				
1	One or more answers to problems are correct. AND/OR One or two logics are correct.				
0	None correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)				

a. I used subtraction. (8750 - 7503 = 1247 points).

OR

I used a calculator to subtract Paul's points from Mark's points to get 1247 points.

b. I used subtraction. (8750 - 8634 = 116 points).

OR

I used a calculator to subtract Roman's points from Mark's points. Roman would need 116 more points to equal Mark's points.

Score Point	Response Attributes
3	All is correct.
	Two logics or explanations are correct.
2	OR
	One logic or explanation and all answers are correct.
	One or more answers to problems are correct.
1	AND/OR
	Any one logic is correct.
None correct. (Also, blanks, rewrites problem, foreign language,	
U	illegible, refusals, off task, etc., scored as invalid.)

5. Sample Response(s):

- **a.** I subtracted 2316 1657. The difference in the lakes is 659 feet.
- **b.** I subtracted 1932 1657. The difference in the lakes is 275 feet.
- **c.** The deepest point in Lake Toba is 1736. I added that twice and got 3472 feet. Anything greater than 3472 could be the deepest point in the lake in Russia.

(The explanation for the use of a calculator for all 3 parts with the correct answers would be acceptable.)

Score Point	Response Attributes
3	All is correct.
	All logics or explanations are correct.
2	OR
	Two logics and three or four answers are correct.
	One or more answers to problems are correct.
1	AND/OR
	One or two logics are correct.
0	None correct. (Also, blanks, rewrites problem, foreign language,
U	illegible, refusals, off task, etc., scored as invalid.)

39

- a. I subtracted 6419 from 6697 and got 278. Henry received 278 more votes.
- b. I subtracted 6210 from 7904 and got 1694. Williamson received 1694 more votes.
- **c.** To find out which candidate received the most votes, I added Henry's votes from Elmhurst and Wallisville and got 12,907 votes. Then I added Williamson's votes from Elmhurst and Wallisville and got 14,323 votes. So Williamson received the most votes.

OR

I added: 6697 + 6210 = 12,907 votes for Henry. 6419 + 7904 = 14,323 vote for Williamson. Williamson got the most votes for the two cities combined.

(The explanation for the use of a calculator for all 3 parts with the correct answers would be acceptable.)

Score Point	Response Attributes
3	All is correct.
	All logics or explanations are correct.
2	OR
	Two logics and at least three answers are correct.
	One or more answers to problems are correct.
1	AND/OR
	One or two logics are correct.
0	None correct. (Also, blanks, rewrites problem, foreign language, illegible,
U	refusals, off task, etc., scored as invalid.)

a. I used a calculator to find the difference between the total miles flown by Paul and Jamal. In my calculator I put 1429 – 714. The difference was 715 miles.
 OR

I subtracted 714 from 1429 and got a difference of 715 miles.

b. I added 1429 to 714 to get 2143 total miles.

OR

I used a calculator to add Paul and Jamal's total miles. The total number of miles flown by both was 2143.

c. No, I do not agree with Billy. The former students who crossed more than 3 states is 1429 + 714 = 2143 and the students who crossed exactly 3 states is 523 + 349 = 872 miles.

Score Point	Response Attributes
3	All is correct.
	All logics or explanations are correct.
2	OR
	Two logics and all answers are correct.
	One or more answers to problems are correct.
1	AND/OR
	One or two logics are correct.
0	None correct. (Also, blanks, rewrites problem, foreign language,
U	illegible, refusals, off task, etc., scored as invalid.)

NUMBER AND OPERATIONS

Content Standard 7

Solve problems, including word problems, involving the basic operations of multiplication and division on whole numbers through two-digit multipliers and one-digit divisors.

Item Type

Multiple-choice Open-ended

9*

8

А

B

Additional Information

Word problems/real-life situations may be used. Tables may be used only for graphic organization of information. Fractions will not be used. Use no remainders. Money values may be used. One of the options may be NH, which means "Not Here."

Sample Multiple-Choice Items



C 7

D NH

 students who tried out for baseball into 6 equal groups. A total of 72 students tried out for baseball.				
Hoy	v manv st	udents w	ere nut	
Hov into	w many st each grou	udents w up?	ere put	
 Hov into	w many st each grou 12	udents w up? 14	ere put	

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4.	. Sammy had 75 pieces of candy. He gave an equal number of pieces of candy to each of his 5 friends.					
	Wha piec eacl	at is the to es of cano 1 friend?	otal numb ly Sammy	per of gave to		
	80	70	25	15		

С

D*

B

А

6. Mrs. Grimes will put 14 markers in each box.				
How many markers will Mrs. Grimes need to fill four boxes?				
10	18	46	56	

5.	There are 27 students in Abigail's history class. Abigail wants to give 12 stickers to each student in her class. What is the total number of stickers Abigail will need?	
A	540	C 324*
В	394	D 319

Sample Open-Ended Items

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

- 1. The fourth-grade teacher is buying markers for her class of 30 students. Each box has 6 markers in it. Each student needs 11 markers.
 - a. How many total markers does the teacher need to buy?
 - b. How many boxes of markers should the teacher buy?

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

2. Devon has 17 boxes. Each box has 140 golf balls in it.

- a. How many golf balls are there in all?
- b. If Devon has 7 larger boxes and he wants to separate all the golf balls equally, how many golf balls should go into each of the 7 boxes?

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

- 3. Aria has a jar with *exactly* 180 jellybeans. She wants to give an equal number of jellybeans to 4 of her friends.
 - a. How many jellybeans would each friend get?
 - b. Aria gave jellybeans to 6 friends. How many jellybeans would each friend get?

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

- 4. Mary's mom is planning a party. There will be a total of 18 children.
 - a. If each child gets 2 scoops of ice cream, how many total scoops of ice cream will Mary's mom need?
 - b. If Mary's mom can get 6 scoops of ice cream out of every container, how many containers will she need to buy?

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

- 5. Jacob worked in a hotel laundry room. He folded 8 towels from the laundry basket in 240 seconds.
 - a. If it took him the same length of time to fold each towel, how many seconds did it take him to fold each towel?
 - b. If it were possible for Jacob to keep folding towels at the same rate of seconds per towel, how much time would it take him to fold 24 towels?

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

6. The members of a school board are voting on the new schedule for a middle school. They had the following two choices.

Block: One school day equals 4 periods, with 80 minutes in each period.

Regular: One school day equals 7 periods, with 45 minutes in each period.

- a. What is the total amount of time in 5 school days under the Block schedule?
- b. What is the total amount of time in *5 school days* under the Regular schedule?

Answer Key

Content Standard 7

Sa	mple	Multi	ple-Choice
1.	A		

1. A 2. A

3. B

4. D

5. C

6. D

Sample Open-Ended

1. Sample Response(s): **a.** Since there are 30 students and each student needs 11 markers, then $30 \times 11 =$ 330. The teacher will need a total of 330 markers. OR I used my calculator to multiply 11×30 to get 330 markers. **b.** In part **a**, the teachers needs a total of 330 markers. Since there are 6 markers in each box, I need to divide. $330 \div 6 = 55$. The teacher should buy 55 boxes of markers. **Score Point Response Attributes** All is correct. 3 Two logics or explanations are correct. 2 OR One logic or explanation and all answers are correct. One or more answers to problems are correct

	one of more answers to problems are contect.
1	AND/OR
	Any one logic is correct.
0	None correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

a. To find the total number of balls in all, I multiplied 140 and 17 to get 2380. OR

 $140 \times 17 = 2380$ balls.

b. To separate all the balls equally, then divide. $2380 \div 7 = 340$. Devon would put 340 balls in each box.

Score Point	Response Attributes
3	All is correct.
	Two logics or explanations are correct
2	OR
	One logic or explanation and all answers are correct
One or more answers to problems are correct	
1	AND/OR
	Any one logic is correct.
0	None correct. (Also, blanks, rewrites problem, foreign language,
U	illegible, refusals, off task, etc., scored as invalid.)

3. Sample Response(s):

a. There are 180 and 4 friends, so using my calculator and dividing, each friend would get 45 jellybeans.

OR

- $180 \div 4 = 45$. Each friend would get 45 jellybeans.
- **b.** This time there are still 180 jellybeans, but 6 friends. In my calculator, I put $180 \div 6 = 30$. Each friend would get 30 jellybeans.

Score Point	Response Attributes	
3	All is correct.	
	Two logics or explanations are correct.	
2	OR	
	One logic or explanation and all answers are correct.	
	One or more answers to problems are correct.	
1	AND/OR	
	Any one logic is correct.	
0	None correct. (Also, blanks, rewrites problem, foreign language,	
U	illegible, refusals, off task, etc., scored as invalid.)	

- **a.** There are 18 children and each child gets 2 scoops. Mary's mom will need 36 total scoops of ice cream. $(18 \times 2 = 36)$
- **b.** Since Mary's mom needs 36 scoops of ice cream and she can get 6 scoops out of 1 container, then she will need 6 containers. $(36 \div 6 = 6)$

Score Point	Response Attributes
3	All is correct.
	All logics or explanations are correct.
2	OR
	Two logics or explanations and all answers are correct.
	One or more answers to problems are correct.
1	AND/OR
	One or two logics are correct.
0	None correct. (Also, blanks, rewrites problem, foreign language,
U	illegible, refusals, off task, etc., scored as invalid.)

5. Sample Response(s):

- **a.** I used my calculator to divide. I took $240 \div 8$ to get 30 seconds per towel.
- **b.** If Jacob keeps folding at 30 seconds per towel, then multiply that times 24. The answer is 720 seconds or 12 minutes to fold 24 towels.

Score Point	Response Attributes
3	All is correct.
	Two logics or explanations are correct.
2	OR
	One logic or explanation and all answers are correct.
	One or more answers to problems are correct.
1	OR
	Any one logic is correct.
0	None correct. (Also, blanks, rewrites problem, foreign language,
U	illegible, refusals, off task, etc., scored as invalid.)

a. For the Block schedule it will be a total of 1600 minutes. I first multiplied 80 times 4, because there are 4 periods a day. That totals 320 minutes. Since there are 5 days in the week, I multiplied 320 and 5 to get my final answer.

OR

 $80 \times 4 = 320$ minutes $320 \times 5 = 1600$ minutes

b. For the Regular schedule, I used my calculator to multiply 7 times 45 since there are 7 periods at 45 minutes each. The total minutes are 315. Then, take your total minutes of 315 and multiply by 5 days for a final answer of 1575 minutes.

OR

 $45 \times 7 = 315$ minutes $315 \times 5 = 1575$ minutes

Score Point	Response Attributes
3	All is correct.
	Two logics or explanations are correct.
2	OR
	One logic or explanation and all answers are correct.
One or more answers to problems are correct.	
1	OR
	Any one logic is correct.
0	None correct. (Also, blanks, rewrites problem, foreign language,
U	illegible, refusals, off task, etc., scored as invalid.)

NUMBER AND OPERATIONS

Content Standard 8

Recognize equivalent forms of commonly used fractions and decimals.

Item Type

Multiple-choice

Additional Information

Word problems/real-life situations may be used. Items may give fraction and ask for decimal equivalent. Items may give decimal and ask for fraction equivalent. Money equivalents may be used. Graphics will not be used. Reducing fractions will be required. One of the options may be NH, which means "Not Here."

Sample Multiple-Choice Items

1. Which of the following is equivalent to 0.83?				
$8\frac{3}{10}$ A	$8\frac{3}{100}$ B	83 100 C*	83 10 D	

A $\frac{1}{2} = 0.12$ C $\frac{1}{2} = 1.02$ B $\frac{1}{2} = 0.50*$ D $\frac{1}{2} = 1.2$	2.	Which of the following is true?			
B $\frac{1}{2} = 0.50^*$ D $\frac{1}{2} = 1.2$	A	$\frac{1}{2} = 0.12$	C $\frac{1}{2} = 1.02$		
$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	B	$\frac{1}{2} = 0.50*$	D $\frac{1}{2} = 1.2$		

3. Which of the following is equivalent to $\frac{2}{5}$?			
0.1	1.2	0.4	0.5
A	B	C*	D

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4. Ricl box unlo mor afte Wh did afte	hard had es from a baded 20 k ming and rnoon. at fraction Richard u rnoon?	d to unload 50 a truck. He) boxes in the d the rest in the ton of the boxes I unload in the	
$\frac{3}{5}$	$\frac{1}{2}$	$\frac{2}{5}$	NH
A*	В	С	D

6. Jake played the piano for $\frac{1}{4}$ of an hour. Which decimal is equivalent to $\frac{1}{4}$?				
0	.14	0.20	0.25	0.75
	A	B	C*	D

5. Wh twe	5. What fraction of a dollar is twenty cents?			
1	2	1	1	
20	100	2	5	
Α	В	С	D*	

7. Stuart had 100 stickers in his collection. He placed $\frac{2}{10}$ of them on his folder. What decimal amount is equivalent to $\frac{2}{10}$?				
0.01	0.10	0.02	0.20	
A	B	C	D *	



10. Which fraction is equivalent to $\frac{6}{24}$?				
$\frac{1}{4}$ A*	$\frac{2}{6}$ B	$\frac{1}{5}$ C	$\frac{3}{8}$ D	



Answer Key

Content Standard 8

Sample Multiple-Choice

1. C

2. B

3. C

4. A

5. D

6. C

7. D

8. B

9. B

10. A

ALGEBRA

Content Standard 9

Write number sentences for word problems that involve multiplication or division.

Item Type

Multiple-choice

Additional Information

Word problems/real-life situations may be used. One- or two-digit divisors may be used. Two-digit multipliers should be used.

Sample Multiple-Choice Items

- Jerry gave 12 pieces of candy to each of his 10 friends.
 Which number sentence below could be used to determine how many pieces of candy Jerry gave away?
 A 12 × 10 = □ * C 12 + 10 = □
 B 12 ÷ 10 = □ D 12 - 10 = □
- 2. The auditorium has 480 seats. If there are exactly 60 seats in each row, which number sentence could be used to find how many rows are in the auditorium?

A
$$480 - 60 = \square$$

B $480 \times 60 = \square$
C $480 + 60 = \square$
D $480 \div 60 = \square *$

3. Each shelf in the library has 27 books.

If there are 19 shelves in the library, which of the following could be used to find *B*, the total number of books in the library?

- **A** $27 \times 19 = B^*$ **B** 27 + 19 = B
- **C** $27 \div 19 = B$
- **D** 27 19 = B

5. Debbie bought 18 hair clips. Each hair clip cost \$3, including tax.

> Which number sentence could be used to determine the total cost of the hair clips?

- **A** $18 + \$3 = \square$
- **B** $18 $3 = \square$ **C** $18 \times $3 = \square *$
- $C \quad 18 \times \$3 = \square \\ D \quad 18 \div \$3 = \square$
- 4. Mr. Lester has 120 cookies to pack in boxes. He will pack

20 cookies in each box. Which of the following could be used to determine *B*, the total number of boxes Mr. Lester needs to pack the

A 120 - 20 = B

cookies?

- **B** $120 \div 20 = B^*$
- **C** $120 \times 20 = B$
- **D** 120 + 20 = B

6. Melissa spent \$8.58 for a package of 6 golf balls.

Which number sentence could be used to determine the price per golf ball if the golf balls were sold individually?

- $\mathbf{A} \quad \$8.58 \times 6 = \square$
- **B** $\$8.58 6 = \square$
- **C** $\$8.58 + 6 = \square$
- **D** $\$8.58 \div 6 = \blacksquare *$

7. Each video in Sandra's store cost \$18. She sold a total of 31 videos.

> Which number sentence could be used to determine the total cost of videos Sandra sold?

- A $31 \$18 = \square$ B $31 + \$18 = \square$ C $31 \times \$18 = \square *$
- **D** $31 \div \$18 = \square$

9. Payton and 5 of his friends shared a box of cookies. The box has 60 cookies.

> If they each ate an equal number of cookies, which shows how many cookies each person ate?

$$\mathbf{A} \quad 60 \times 6 = \square$$

- **B** $60 \div 6 = \square *$
- C $60 \times 5 = \square$
- $\mathbf{D} \quad 60 \div 5 = \square$

8. Frankie had a total of 60 ounces of lemonade in a container. She poured all the lemonade into 10 small glasses so each glass had the same amount.

> Which number sentence could be used to determine the amount of lemonade Frankie poured into each glass?

$$\mathbf{A} \quad 10 \div 60 = \square$$

$$\mathbf{B} \quad 60 \div 10 = \square$$

C
$$60 - 10 = \square$$

D
$$10 + 60 =$$

Answer Key

Content Standard 9

Sample Multiple-Choice

1. A

2. D 3. A

4. B

4. D 5. C

5. C 6. D

7. C

8. B

9. B

ALGEBRA

Content Standard 10

Complete addition and subtraction number sentences with a missing addend or subtrahend.

Item Type

Multiple-choice Gridded

Additional Information

Word problems/real-life situations may be used. Use up to 4-digit numbers. Money values may be used. A box or variable may be used.

Sample Multiple-Choice Items



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8. The area of Barbados is 91 square kilometers greater th the area of Grenada. The number sentence below can used to determine the area o Grenada.						
	430 - 🗖 = 91					
What is the area, in square kilometers, of Grenada?						
5	521	511	349	339		
	A	В	С	D*		



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Sample Gridded Items





Mark your answer in the answer grid.

2. What number goes in the to make the number sentence below true?

Mark your answer in the answer grid.

4. Dimitri scored 37 more points during the basketball season than Evette. Dimitri scored a total of 123 points. The number of points Evette scored can be determined by solving the number sentence below.

What is the total number of points scored by Evette?

Mark your answer in the answer grid.

5. What value for the box makes the number sentence below true?

 $123 - \Box = 73$

Mark your answer in the answer grid.

6. What value of *x* makes the equation below true?

97 - x = 40

Mark your answer in the answer grid.

7. The workers in the school store ordered 4500 pencils. They ordered 2800 more pencils than pens. The number of pens they ordered can be determined by solving the number sentence below.

$$2800 + \Box = 4500$$

What number goes in the to make the number sentence true?

Mark your answer in the answer grid.

Answer Key

Content Standard 10

Sample Multiple-Choice

1. B

2. C

3. D

4. C

5. B

6. A

7. B

8. D

9. A

Sample Gridded

1.79

- 2.10
- 3.43
- 4.86
- 5.50

6. 57

7.1700

GEOMETRY

Content Standard 11

Identify triangles, quadrilaterals, pentagons, hexagons, or octagons based on the number of sides, angles, and vertices.

Item Type

Multiple-choice

Additional Information

Graphics may be used. Word problems/real-life situations will be used.

Sample Multiple-Choice Items








C Octagon





- C Octagon
- **D** Quadrilateral



13. The picture below shows a tile on the side of a swimming pool.



Which *best* describes the two shapes on the tile?

- A An octagon inside a quadrilateral*
- **B** An octagon inside a pentagon
- **C** A hexagon inside a quadrilateral
- **D** A hexagon inside a pentagon

- 14. Which type of geometric figure has *exactly* 4 vertices?
- A Triangle
- **B** Hexagon
- C Quadrilateral*
- **D** Pentagon

Answer Key

Content Standard 11

Sample Multiple-Choice

1. C 2. B

3. A

4. D

5. B 6. D

0. D 7. D

8. B

9. C

10. A

11. A

12. D 13. A

13. A 14. C

14. U

GEOMETRY

Content Standard 12

Find locations on a map or a grid using ordered pairs.

Item Type

Multiple-choice

Additional Information

Word problems/real-life situations may be used.

Sample Multiple-Choice Items











Answer Key

Content Standard 12

Sample Multiple-Choice

1. C

2. D

3. C

4. B 5. A

6. D

MEASUREMENT

Content Standard 13

Calculate elapsed time in hours and minutes.

Item Type

Multiple-choice

Additional Information

Word problems/real-life situations may be used. Will include a start time and an end time.

Sample Multiple-Choice Items

1. Hal's race began at 8:15 A.M. The race ended at 3:30 P.M.

What was the total time of the race?

- A 5 hours and 15 minutes
- **B** 7 hours and 15 minutes*
- C 8 hours and 45 minutes
- **D** 11 hours and 45 minutes

2. On Wednesday, Angela began studying at 3:17 P.M. She studied until 4:22 P.M. that same day without taking a break.

How long did Angela study on Wednesday?

- A 49 minutes
- **B** 55 minutes
- C 1 hour and 5 minutes*
- **D** 1 hour and 32 minutes

3. The start and end times of three baseball games are listed in the table below.

Baseball Game Times			
Game	Start Time	End Time	
1	7:05 р.м.	7:55 p.m.	
2	7:55 p.m.	8:45 p.m.	
3	8:45 p.m.	9:35 p.m.	

How long was each baseball game?

- A 55 minutes
- **B** 50 minutes*
- C 45 minutes
- **D** 40 minutes
- 4. Keefe put a cake in the oven at 12:35 P.M. He took the cake out of the oven at 1:28 P.M.

What is the total amount of time the cake was in the oven?

- **A** 2 hours and 3 minutes
- **B** 1 hour and 7 minutes
- C 53 minutes*
- **D** 47 minutes

Answer Key

Content Standard 13

Sample Multiple-Choice
1. B

2. C

3. B

4. C

MEASUREMENT

Content Standard 14

Measure length, width, weight, and capacity using metric and customary units, and temperature in degrees Fahrenheit and degrees Celsius.

Item Type

Multiple-choice

Additional Information

Thermometers will not have both Celsius and Fahrenheit scales. Measure length to the nearest whole unit, half unit, quarter unit. Word problems/real-life situations may be used.

Sample Multiple-Choice Items

















Answer Key

Content Standard 14

Sample Multiple-Choice

1. D

2. B

3. A

4. D

5. B

6. A

7. C

8. C

9. B

DATA ANALYSIS AND PROBABILITY

Content Standard 15 & 17

Represent categorical and numerical data using tables and graphs, including bar graphs, line graphs, and line plots.

Item Type

Multiple-choice Open-ended

Additional Information

Limit data to be drawn in graphs, tables, etc., to no more than 5 items. Word problems/real-life situations may be used.

Sample Multiple-Choice Items

(continued on next page)



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2. The manager of the cafeteria took a survey of the number of sandwiches sold on a particular day. These were the results the manager obtained.

Type of Sandwich	Egg Salad	Peanut Butter	Ham and Cheese	Tomato and Cheese
Number Sold	30	45	25	50

Which graph below *best* represents the data presented in the chart shown above?



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Basketball Player Heights

Player	Height in Inches
Johnson	75
Barrington	72
Holmes	79
Westford	83
Nguyen	77

A*

Basketbal	l Player Heights
Player	Height in Inches

Johnson	80
Barrington	77
Holmes	77
Westford	83
Nguyen	79

B

Basketball Player Heights

Player	Height in Inches
Johnson	75
Barrington	72
Holmes	79
Westford	93
Nguyen	77

С

Basketball Player Heights

Player	Height in Inches
Johnson	65
Barrington	62
Holmes	69
Westford	73
Nguyen	67

D







people of different ages who exercised at a gym?

Age of Exercisers			
Age	Number of People		
Under 20	21		
Between 20 and 40	55		
Between 41 and 60	48		
Between 61 and 80	19		
Over 80	1		

А

Age of Exercisers			
Age	Number of People		
Under 20	1		
Between 20 and 40	19		
Between 41 and 60	58		
Between 61 and 80	75		
Over 80	21		

B

	e		•		
Δσρ	nt	HVAR	'^1G	pr	°C
ngu	UI	LAU	C13	CI.	5

Age	Number of People
Under 20	21
Between 20 and 40	85
Between 41 and 60	58
Between 61 and 80	19
Over 80	1

С

Age of Exercisers

Number of People
21
65
58
19
1

D*

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Sample Open-Ended Items

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

1. The chart shows a fourth-grade class' favorite subjects.

Favorite Subjects		
Subject	Number of	
	Students	
Math	7	
Reading	3	
Science	5	
History	6	
Grammar	4	

Use the information from the chart to make and label a line graph.

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

2. The chart below shows the weights of some of the largest diamonds in the world.

Diamond Weights		
Diamond	Weight in Hundreds of Carats (rounded)	
А	2	
В	3	
С	2	
D	2	
Е	4	

Use the information from the chart to make and label a bar graph.

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

3. The age of some of the members of Elaine's quilting club are listed in the chart below.

Member	Age
Elaine	22
Juan	43
Marsha	67
Nadine	39
Sheila	33

Age of Quilting Club Members

Use the information from the chart to make and label a bar graph.

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

4. The lengths of several different snakes in a reptile zoo are listed in the chart below.

Snake Lengths	
Snake	Length (in centimeters)
A	39
В	43
C	68
D	49
E	53
F	59
G	61
Н	34
Ι	45
J	50

Using this information, make and label another chart showing the *number* of snakes that have lengths that are between:

- 30 and 39 centimeters
- 40 and 49 centimeters
- 50 and 59 centimeters
- 60 and 69 centimeters

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

5. At each second, Jenny is measuring the amount of water left in a container that is being drained. She noticed that 4 ounces of water left the container each second.

Water in Container	
Number of	Amount of Water Left,
Seconds	in Ounces
1	62
2	58
3	54
4	50
5	46

Make and label a line graph using the information from the chart.
This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

The number of popcorn bags sold during 10 different home basketball 6. games is listed in the chart below.

n Bags Solu
Number Sold
47
52
43
62
70
41
39
49
62
69

Popcorn	Bags	Sold
I Opcorn	Dugs	D'UIU

Make and label another chart showing the number of days that the number of popcorn bags sold were between:

- 30 through 39
- 40 through 49
- 50 through 59
- 60 through 69
- 70 through 79

Show all your work and/or explain your reasoning in the space provided in the answer document.

Answer Key

Content Standard 15 & 17

Sample Multiple-Choice

1. B 2. A 3. B

4. C

5. B

6. A

7. C

8. A

9. D

10. D

Sample Open-Ended







foreign language, megiole, refusais, on task, etc., seored as invalid.)

4. Samp	le Re	sponse(s):		
		Snake Leng	ths	
	Len	gth in centimeters	Number of Snakes	
	Between 30 and 39		2	
Between 40 and 49		3		
Between 50 and 59		3		
Between 60 and 69		2		
Score P	oint	t Response Attributes		
3		Chart or graph is completely correct.		
2		Chart or graph with one to three errors.		
1		Chart or graph has more than three errors.		
0	0 No chart or graph or none correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)			



6. Sample Response(s):

Popcorn Bags Sold		
Range	Number of Days	
30 through 39	1	
40 through 49	4	
50 through 59	1	
60 through 69	3	
70 through 79	1	

Score Point	Response Attributes
3	Chart or graph is completely correct.
2	Chart or graph with one to three errors.
1	Chart or graph has more than three errors.
No chart or graph or none correct. (Also, blanks, rewrites problem,	
U	foreign language, illegible, refusals, off task, etc., scored as invalid.)

DATA ANALYSIS AND PROBABILITY

Content Standard 16

Determine if outcomes of simple events are likely, unlikely, certain, equally likely, or impossible.

Item Type

Multiple-choice

Additional Information

Use only the choices mentioned in content standard. Word problems/real-life situations may be used.

Sample Multiple-Choice Items

1. Ellie placed 18 red marbles, 2 black marbles, and 3 yellow marbles into a bag.

> If she chooses 1 marble from the bag without looking, what is the likelihood that Ellie will choose a red marble?

- A Unlikely C Certain
- **B** Impossible **D** Likely*
- 2. Avery was born in a month that begins with the letter M.
 Which of the following best describes the likelihood that Avery was born in April?
 A Certain C Impossible*
 B Unlikely D Likely
- 3. While it was raining, Sid went for a walk outside without an umbrella.
 Which of the following best describes the likelihood that Sid got wet?
 A Certain* C Impossible
 B Unlikely D Likely



4. A radio station manager gives out a prize every day at 10:00 in the morning.

> If it is 9:45 in the morning, which *best* describes the likelihood that the manager will give a prize out within the next hour?

A Certain* C Impossible

D Likely

B Unlikely

6. Tracie wrote 18 boys' names and 18 girls' names on separate pieces of paper and placed them into a hat. She took one piece of paper out of the hat without looking.

> If this was Tracie's first try, what is the chance that the piece of paper she took out had a boy's name on it?

- A Certain C Impossible
- **B** Unlikely **D** Equally likely*

5. It took 20 garden club members 4 hours to plant a total of 1000 begonias.

> At this rate and with the same number of members working, which of the following *best* describes the chances that they will plant a total of 10,000 begonias in 5 hours?

- A Certain C Likely
- **B** Unlikely* **D** Equally likely

7. Mrs. Smith taped a different colored piece of paper to each face of a cube. She then rolled the cube on top of her desk.

Which of the following *best* describes the chances that the cube showed a face with a colored piece of paper on it?

- Certain* C Impossible
- **B** Unlikely **D** Equally likely

A

8. The mass of an elephant on December 1, 2004, was 2080 kilograms.

> What is the probability that the mass of the same elephant on December 2, 2004, was 2500 kilograms?

A Certain C Likely

B Unlikely* **D** Equally likely

9. Kendra counted exactly 10 different vehicles in the parking lot. She noticed that 5 of the vehicles were white and 5 were blue.

Which of the following *best* describes the chances that the first vehicle to leave the parking lot would be blue?

- A Certain C Equally likely*
- **B** Unlikely **D** Impossible



Answer Key

Content Standard 16

Sample Multiple-Choice

1. D 2. C

3. A

4. A

5. B

6. D

7. A

8. B 9. C

). C 10. D

SAMPLE RESPONSE FORMAT

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SAMPLE RESPONSE: MULTIPLE-CHOICE

1 A B C D
2 A B C D
3 A B C D
4 A B C D
5 A B C D

6 A B C D	
7 A B C D	
8 A B C D	

9 A B C D	
10 A B C D	

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SAMPLE RESPONSE: GRIDDED





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