

MATHEMATICS Grade 7

Administered Spring 2004

Test by Objectives

Mathematics Chart

LENGTH

Metric

1 kilometer = 1000 meters
1 meter = 100 centimeters
1 centimeter = 10 millimeters

Customary

1 mile = 1760 yards
1 mile = 5280 feet
1 yard = 3 feet
1 foot = 12 inches

CAPACITY AND VOLUME

Metric

1 liter = 1000 milliliters

Customary

1 gallon = 4 quarts
1 gallon = 128 ounces
1 quart = 2 pints
1 pint = 2 cups
1 cup = 8 ounces

MASS AND WEIGHT

Metric

1 kilogram = 1000 grams
1 gram = 1000 milligrams

Customary

1 ton = 2000 pounds
1 pound = 16 ounces

TIME

1 year = 365 days
1 year = 12 months
1 year = 52 weeks
1 week = 7 days
1 day = 24 hours
1 hour = 60 minutes
1 minute = 60 seconds

Mathematics Chart

Perimeter	square	$P = 4s$
	rectangle	$P = 2l + 2w$ or $P = 2(l + w)$
Circumference	circle	$C = 2\pi r$ or $C = \pi d$
Area	square	$A = s^2$
	rectangle	$A = lw$ or $A = bh$
	triangle	$A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$
	trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$
	circle	$A = \pi r^2$
Volume	cube	$V = s^3$
	rectangular prism	$V = lwh$ or $V = Bh^*$
	cylinder	$V = \pi r^2h$ or $V = Bh^*$
<i>*B represents the area of the Base of a solid figure.</i>		
Pi	π	$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$

Grade 7-2004

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(7.2) Number, operation, and quantitative reasoning. The student adds, subtracts, multiplies, or divides to solve problems and justify solutions. The student is expected to

(D) use division to find unit rates and ratios in proportional relationships such as speed, density, price, recipes, and student-teacher ratio;

1 Emmanuel can run 100 meters in 20 seconds. If he competes in the 400-meter race, about how many seconds will it take him to run the race?

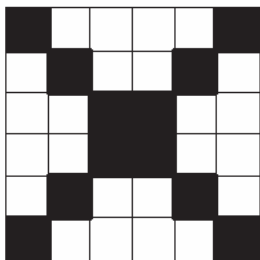
- A 5 sec
- B 4 sec
- C 80 sec
- D 20 sec

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(7.1) Number, operation, and quantitative reasoning. The student represents and uses numbers in a variety of equivalent forms. The student is expected to

(B) convert between fractions, decimals, whole numbers, and percents mentally, on paper, [or with a calculator];

14 Sandra colored $\frac{1}{3}$ of her picture black, as shown below.



What percent of her picture did Sandra color black?

- F 12%
- G 24%
- H $33\frac{1}{3}\%$
- J $66\frac{2}{3}\%$

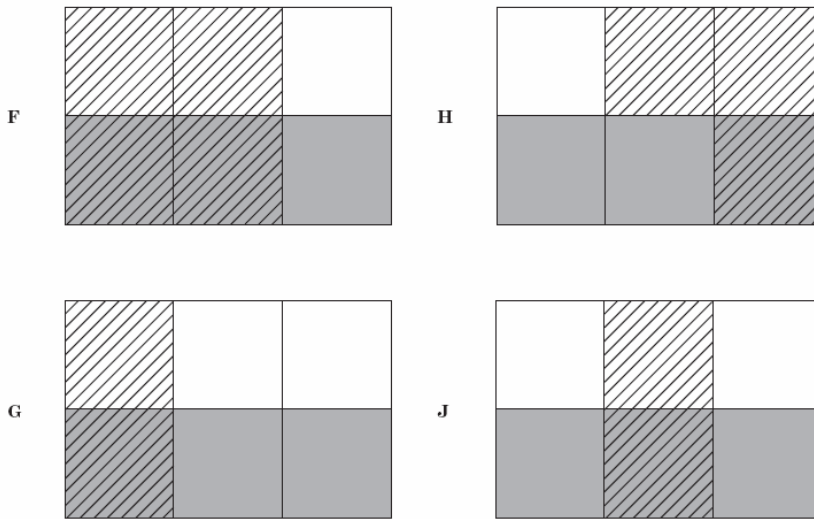
Grade 7-2004

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(7.2) Number, operation, and quantitative reasoning. The student adds, subtracts, multiplies, or divides to solve problems and justify solutions. The student is expected to

(A) represent multiplication and division situations involving fractions and decimals with [concrete] models, pictures, words, and numbers;

24 Which model best represents the expression $\frac{1}{2} \times \frac{2}{3}$?

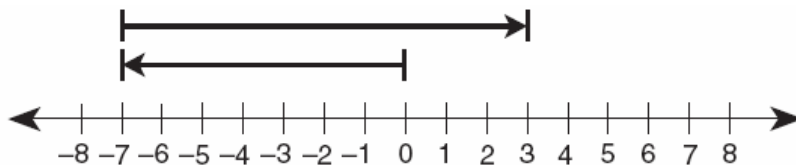


Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(7.2) Number, operation, and quantitative reasoning. The student adds, subtracts, multiplies, or divides to solve problems and justify solutions. The student is expected to

(C) use models to add, subtract, multiply, and divide integers and connect the actions to algorithms;

27 Which expression is represented by the model below?



- A $-7 + 0$
- B $-7 + 3$
- C $-7 + 7$
- D $-7 + 10$

Grade 7-2004

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(7.2) Number, operation, and quantitative reasoning. The student adds, subtracts, multiplies, or divides to solve problems and justify solutions. The student is expected to

(E) simplify numerical expressions involving order of operations and exponents;

30 Simplify the expression below.

$$4 + 2(13 - 4) \div 3^2$$

- F** 7
- G** 6
- H** 2
- J** 8

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(7.1) Number, operation, and quantitative reasoning. The student represents and uses numbers in a variety of equivalent forms. The student is expected to

(B) convert between fractions, decimals, whole numbers, and percents mentally, on paper, [or with a calculator];

31 It is estimated that 20.4% of the U.S. population in the year 2050 will be over the age of 65. Which number is NOT equivalent to 20.4%?

- A** $\frac{204}{1,000}$
- B** $\frac{20.4}{100}$
- C** 0.204
- D** 2.04

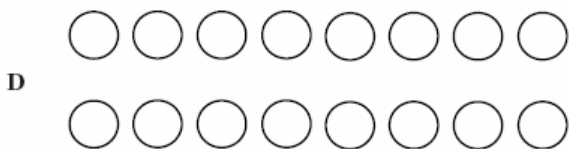
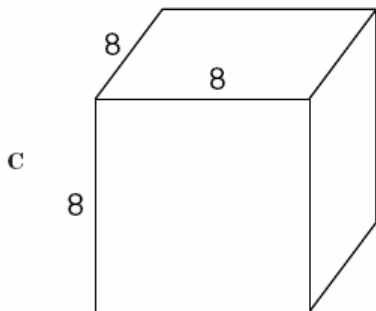
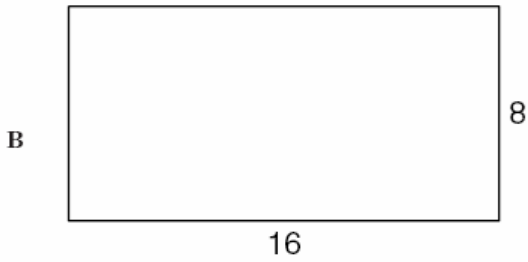
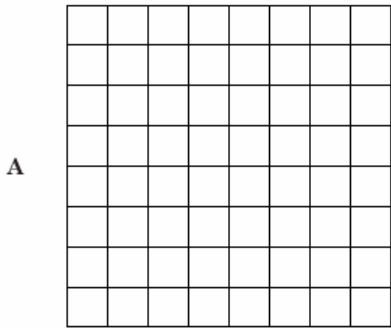
Grade 7-2004

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(7.1) Number, operation, and quantitative reasoning. The student represents and uses numbers in a variety of equivalent forms. The student is expected to

(C) represent squares and square roots using geometric models.

33 Which model represents 8^2 ?



Grade 7-2004

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(7.1) Number, operation, and quantitative reasoning. The student represents and uses numbers in a variety of equivalent forms. The student is expected to

(A) compare and order integers and positive rational numbers;

38 An electrician has been working at 4 customer sites. He has completed $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{3}{4}$ of his work at the sites. Which list shows the percent of work completed at the sites in order from greatest to least?

- F** 12.5%, 25%, 50%, 75%
- G** 0.75%, 0.125%, 0.25%, 0.50%
- H** 75%, 50%, 25%, 12.5%
- J** 25%, 50%, 75%, 125%

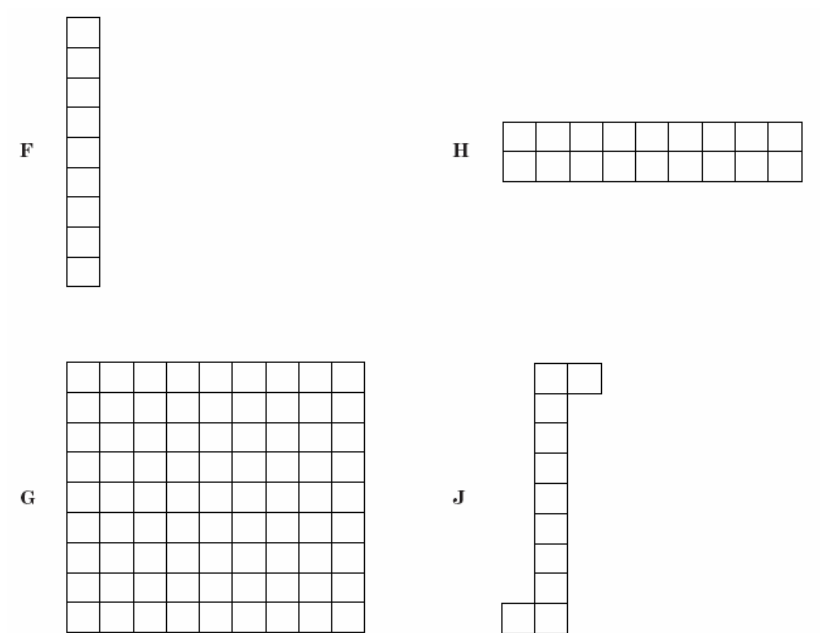
Grade 7-2004

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(7.1) Number, operation, and quantitative reasoning. The student represents and uses numbers in a variety of equivalent forms. The student is expected to

(C) represent squares and square roots using geometric models.

42 Which model represents 9^2 ?



Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(7.2) Number, operation, and quantitative reasoning. The student adds, subtracts, multiplies, or divides to solve problems and justify solutions. The student is expected to

(G) determine the reasonableness of a solution to a problem.

45 Peaches are on sale at \$0.95 per pound. Mrs. Hinkle bought 2.75 pounds of peaches. About how much did she pay for the peaches?

- A** Less than \$1.00
- B** Between \$1.50 and \$2.00
- C** Between \$2.50 and \$3.00
- D** More than \$3.00

Grade 7-2004

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(7.4) Patterns, relationships, and algebraic thinking. The student represents a relationship in numerical, geometric, verbal, and symbolic form. The student is expected to

(A) generate formulas involving conversions, perimeter, area, circumference, volume, and scaling;

4 Mrs. Penn has a circular tablecloth with a circumference of 29 feet. Which expression could be used to find the radius of the tablecloth?

F $29 - 2\pi$

G $\frac{29}{2\pi}$

H $\frac{29}{\pi}$

J $29 + 2\pi$

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(7.4) Patterns, relationships, and algebraic thinking. The student represents a relationship in numerical, geometric, verbal, and symbolic form. The student is expected to

(C) describe the relationship between the terms in a sequence and their positions in the sequence.

12 Which sequence follows the rule $8n - 4$, where n represents the position of a term in the sequence?

F 16, 12, 8, 4, 0, ...

G 8, 16, 24, 32, 40, ...

H 4, 16, 64, 216, 1,024, ...

J 4, 12, 20, 28, 36, ...

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(7.3) Patterns, relationships, and algebraic thinking. The student solves problems involving proportional relationships. The student is expected to

(A) estimate and find solutions to application problems involving percent;

16 Mrs. Loya sponsors the Spanish club at Central Middle School. The club has 8 members who are sixth graders, 12 members who are seventh graders, and 10 members who are eighth graders. What percent of the Spanish club members are seventh graders?

F 40%

G 30%

H 26%

J 10%

Grade 7-2004

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(7.4) **Patterns, relationships, and algebraic thinking.** The student represents a relationship in numerical, geometric, verbal, and symbolic form. The student is expected to

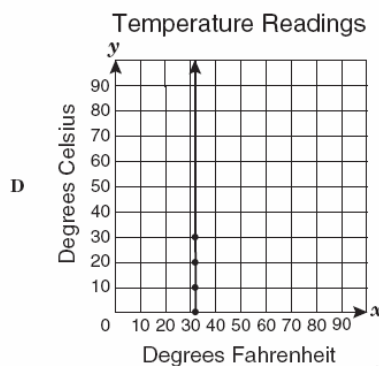
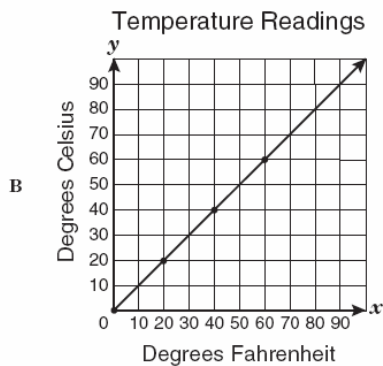
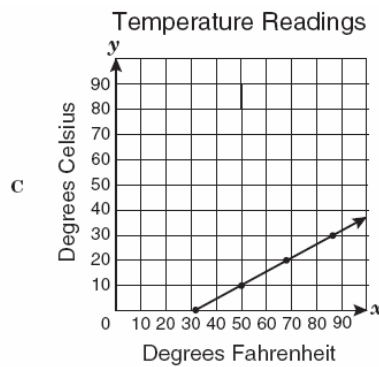
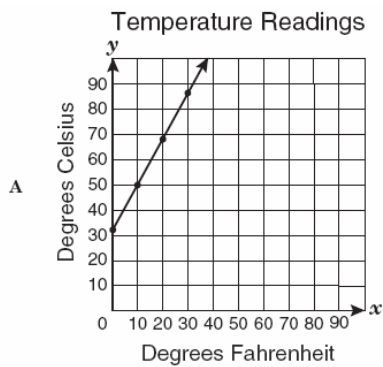
(B) graph data to demonstrate relationships in familiar concepts such as conversions, perimeter, area, circumference, volume, and scaling;

19 The data in the table below show the relationship between temperature readings in degrees Fahrenheit, x , and degrees Celsius, y .

Temperature Readings

Degrees Fahrenheit, x	Degrees Celsius, y
32	0
50	10
68	20
86	30

Which graph best represents the data in the table above?



Grade 7-2004

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(7.4) **Patterns, relationships, and algebraic thinking.** The student represents a relationship in numerical, geometric, verbal, and symbolic form. The student is expected to

(C) describe the relationship between the terms in a sequence and their positions in the sequence.

20 Which description shows the relationship between a term and n , its position in the sequence?

Position	1	2	3	4	5	n
Value of Term	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	

F Multiply n by $\frac{1}{2}$

G Subtract $\frac{1}{2}$ from n

H Add $\frac{1}{2}$ to n

J Divide n by $\frac{1}{2}$

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(7.3) **Patterns, relationships, and algebraic thinking.** The student solves problems involving proportional relationships. The student is expected to

(A) estimate and find solutions to application problems involving percent;

25 Which of the following represents the greatest percent of change?

- A A tree grew from 6 feet to 12 feet in 1 year.
- B An aquarium that was originally priced at \$80 is now \$60.
- C A person whose salary was \$100 per week is now earning \$120 per week.
- D A baby who weighed 7 pounds at birth now weighs 16 pounds.

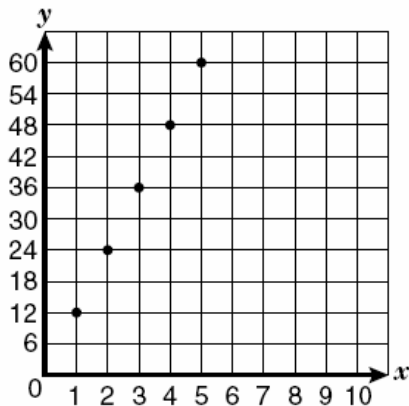
Grade 7-2004

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(7.4) **Patterns, relationships, and algebraic thinking.** The student represents a relationship in numerical, geometric, verbal, and symbolic form. The student is expected to

(B) graph data to demonstrate relationships in familiar concepts such as conversions, perimeter, area, circumference, volume, and scaling;

32 Which of the following relationships is best represented by the data in the graph?



- F Conversion of feet to inches
- G Conversion of miles to feet
- H Conversion of feet to yards
- J Conversion of inches to yards

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(7.5) **Patterns, relationships, and algebraic thinking.** The student uses equations to solve problems. The student is expected to

(B) formulate a possible problem situation when given a simple equation.

37 Which problem situation matches the equation below?

$$x - 4.72 = 5.28$$

- A Sergio's lunch cost \$4.72. He received \$5.28 in change when he paid the bill. What is x , the amount of money he gave the cashier?
- B Yvette cycled 4.72 kilometers in a race. The winning cyclist's time was 5.28 seconds faster than Yvette's. What is x , the time in seconds it took Yvette to finish the race?
- C Janice and Maura measured the wingspans of butterflies in science class. Janice's butterfly had a wingspan of 4.72 centimeters, and Maura's butterfly had a wingspan of 5.28 centimeters. What is x , the average length of a butterfly's wingspan?
- D Mrs. Castro paid \$4.72 for a jar of iced-tea mix that was originally priced at \$5.28. What is x , the amount of money that Mrs. Castro saved altogether?

Grade 7-2004

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(7.5) Patterns, relationships, and algebraic thinking. The student uses equations to solve problems. The student is expected to

(A) use [concrete] models to solve equations and use symbols to record the actions;

44 The model represents the equation $x - 8 = 2$.

$$\triangle x \quad \ominus \ominus \ominus \ominus \quad = \quad \oplus \oplus$$

Key	
$\oplus = +1$	$\ominus = -1$

What is the value of x ?

- F** $x = -6$
- G** $x = 4$
- H** $x = 8$
- J** $x = 10$

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(7.3) Patterns, relationships, and algebraic thinking. The student solves problems involving proportional relationships. The student is expected to

(B) estimate and find solutions to application problems involving proportional relationships such as similarity, scaling, unit costs, and related measurement units.

47 An athlete on the school football team can run 20 yards in 2.9 seconds. During the last football game, the athlete ran 64 yards for a touchdown. If the athlete's rate of speed remained the same, about how long did it take him to run for the touchdown?

- A** 9.3 sec
- B** 21.3 sec
- C** 58 sec
- D** 19.2 sec

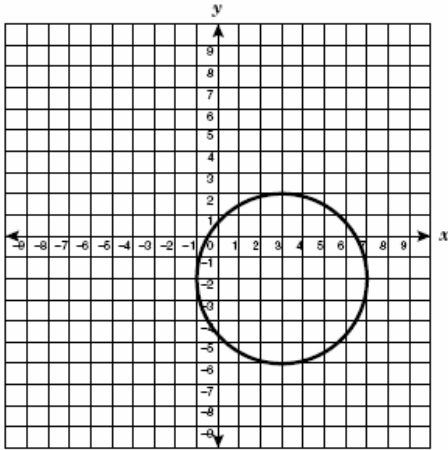
Grade 7-2004

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning.

(7.7) Geometry and spatial reasoning. The student uses coordinate geometry to describe location on a plane. The student is expected to

(A) locate and name points on a coordinate plane using ordered pairs of integers;

2 Which of the following coordinates lie within the circle graphed below?



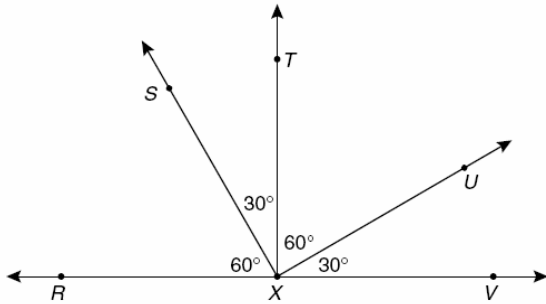
- F (2, 3)
- G (3, -5)
- H (3, 3)
- J (5, 3)

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning.

(7.6) Geometry and spatial reasoning. The student compares and classifies shapes and solids using geometric vocabulary and properties. The student is expected to

(A) use angle measurements to classify pairs of angles as complementary or supplementary;

5 Which 2 angles are NOT complementary?



- A $\angle RXS$ and $\angle TXU$
- B $\angle SXT$ and $\angle TXU$
- C $\angle RXS$ and $\angle SXT$
- D $\angle TXU$ and $\angle UXV$

Grade 7-2004

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning.

(7.6) **Geometry and spatial reasoning.** The student compares and classifies shapes and solids using geometric vocabulary and properties. The student is expected to

(D) use critical attributes to define similarity.

9 Which of the following is NOT true about similar figures?

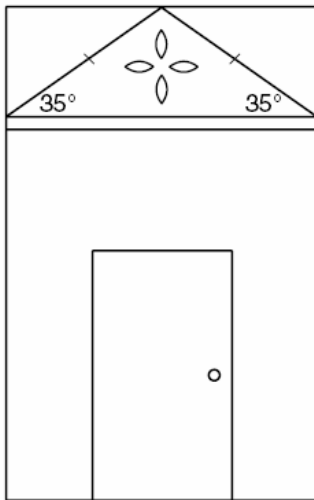
- A Similar figures always have the same shape.
- B Similar figures always have the same size.
- C Similar figures always have corresponding angles that are equal.
- D Similar figures always have corresponding sides that are proportional.

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning.

(7.6) **Geometry and spatial reasoning.** The student compares and classifies shapes and solids using geometric vocabulary and properties. The student is expected to

(B) use properties to classify shapes including triangles, quadrilaterals, pentagons, and circles;

15 Mr. Olivares installed a triangular piece of stained glass above his front door.



Which of the following best describes the triangle with the given measures?

- A Acute equilateral triangle
- B Obtuse isosceles triangle
- C Right scalene triangle
- D Right isosceles triangle

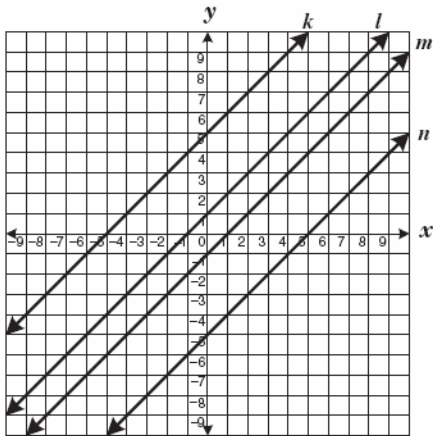
Grade 7-2004

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning.

(7.7) Geometry and spatial reasoning. The student uses coordinate geometry to describe location on a plane. The student is expected to

(A) locate and name points on a coordinate plane using ordered pairs of integers;

34 Which line contains the ordered pair $(2, -3)$?



- F** Line k
- G** Line l
- H** Line m
- J** Line n

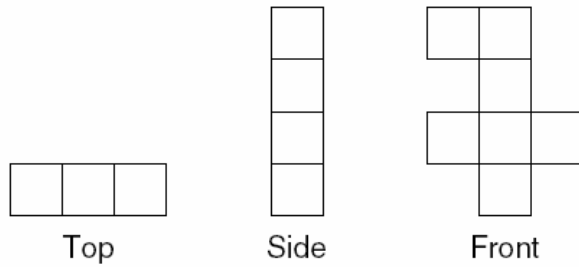
Grade 7-2004

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning.

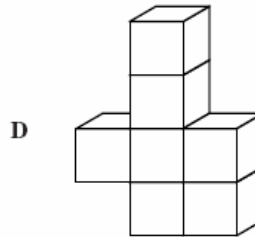
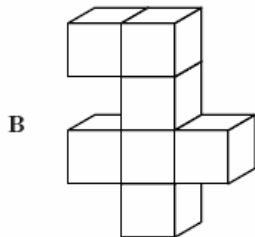
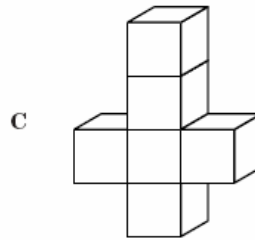
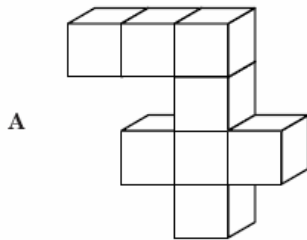
(7.8) Geometry and spatial reasoning. The student uses geometry to model and describe the physical world. The student is expected to

(A) sketch a solid when given the top, side, and front views;

39 The top, side, and front views of a solid figure made of cubes are shown below.



Which solid figure is best represented by these views?



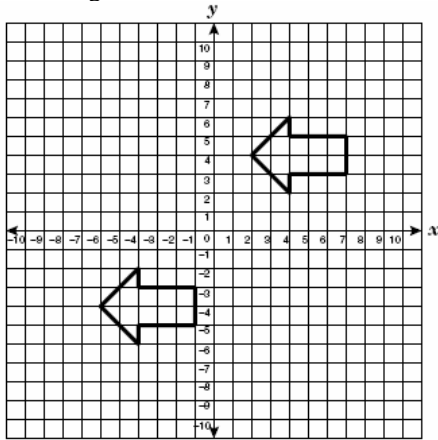
Grade 7-2004

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning.

(7.7) **Geometry and spatial reasoning.** The student uses coordinate geometry to describe location on a plane. The student is expected to

(B) graph translations on a coordinate plane.

43 The figure below was transformed from quadrant I to quadrant III.



This transformation best represents a —

- A** translation
- B** tessellation
- C** rotation
- D** reflection

Grade 7-2004

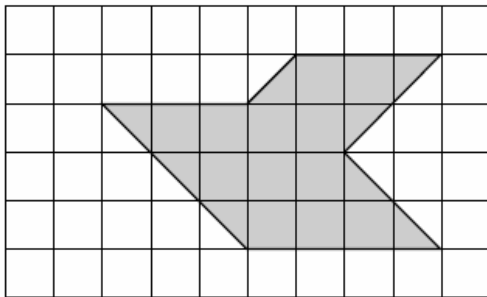
Objective 4: The student will demonstrate an understanding of the concepts and uses of measurement.

(7.9) **Measurement.** The student solves application problems involving estimation and measurement. The student is expected to

(A) estimate measurements and solve application problems involving length (including perimeter and circumference), area, and volume.

7 Bloom's Nursery designed a plan for Mrs. Hartrick's flower bed, as shown in the shaded part of the grid below.

Flower-Bed Plan



Each square on the grid represents 5 square feet. What will be the approximate area of the flower bed?

- A 100 ft^2
- B 80 ft^2
- C 20 ft^2
- D 16 ft^2

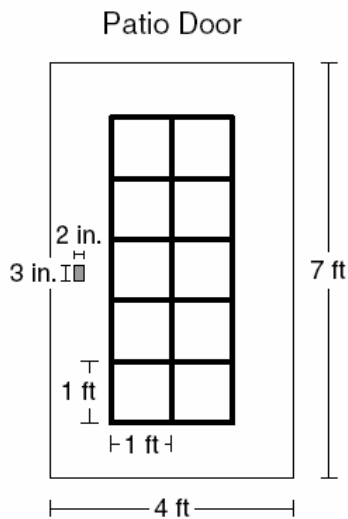
Grade 7-2004

Objective 4: The student will demonstrate an understanding of the concepts and uses of measurement.

(7.9) **Measurement.** The student solves application problems involving estimation and measurement. The student is expected to

(A) estimate measurements and solve application problems involving length (including perimeter and circumference), area, and volume.

11 Ms. Wagner painted the outside of the patio door to her house, as shown below. She did not paint the window or the doorknob.



Which is closest to the painted area of the door in square feet?

- A** 31 ft^2
- B** 28 ft^2
- C** 25 ft^2
- D** 18 ft^2

Grade 7-2004

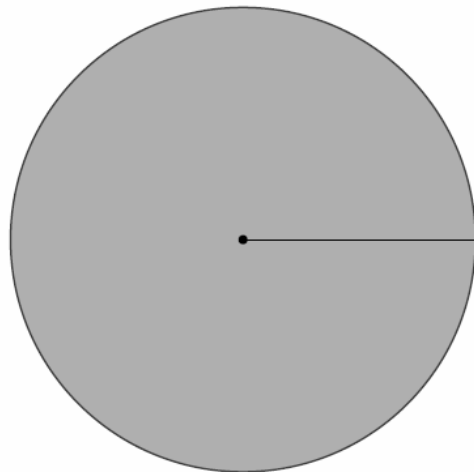
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(7.9) **Measurement.** The student solves application problems involving estimation and measurement. The student is expected to

(A) estimate measurements and solve application problems involving length (including perimeter and circumference), area, and volume.

17 Yoko made a circular coaster in pottery class. Use the ruler on the Mathematics Chart to measure the radius of the coaster in centimeters.

Coaster



Which of the following is closest to the area of the top of the coaster?

- A** 64 cm^2
- B** 24 cm^2
- C** 46 cm^2
- D** 51 cm^2

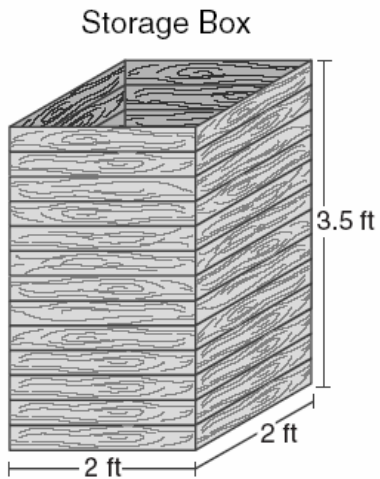
Grade 7-2004

Objective 4: The student will demonstrate an understanding of the concepts and uses of measurement.

(7.9) **Measurement.** The student solves application problems involving estimation and measurement. The student is expected to

(A) estimate measurements and solve application problems involving length (including perimeter and circumference), area, and volume.

21 Mr. Williams built a wooden storage box.



The storage box was 3.5 feet high by 2 feet wide by 2 feet long. What is the volume of the storage box in cubic feet?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

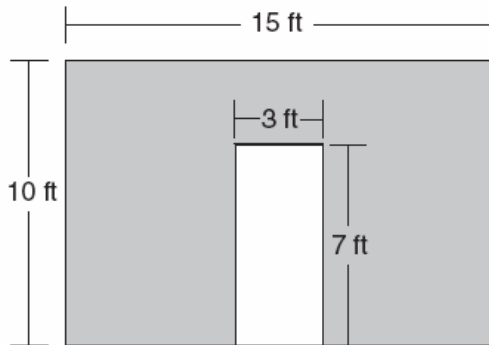
Grade 7-2004

Objective 4: The student will demonstrate an understanding of the concepts and uses of measurement.

(7.9) **Measurement.** The student solves application problems involving estimation and measurement. The student is expected to

(A) estimate measurements and solve application problems involving length (including perimeter and circumference), area, and volume.

22 Mrs. Jones wants to paint a wall but not the door on the wall.



How many square feet of wall does Mrs. Jones need to paint?

- F** 36 ft^2
- G** 171 ft^2
- H** 129 ft^2
- J** 150 ft^2

Grade 7-2004

Objective 5: The student will demonstrate an understanding of probability and statistics.

(7.12) **Probability and statistics.** The student uses measures of central tendency and range to describe a set of data. The student is expected to

(A) describe a set of data using mean, median, mode, and range

26 Mr. Haskell bought 7 calves for \$3,500.00. He later bought another calf for \$660.00. What was the mean cost of all the calves?

- F** \$355.00
- G** \$500.00
- H** \$520.00
- J** \$4,160.00

Objective 5: The student will demonstrate an understanding of probability and statistics.

(7.10) **Probability and statistics.** The student recognizes that a physical or mathematical model can be used to describe the probability of real-life events. The student is expected to

(A) construct sample spaces for compound events (dependent and independent).

28 Trinh has 2 quarters, 1 dime, 2 nickels, and 1 penny in his pocket. Which list shows all the possible unique outcomes if Trinh chooses 3 coins at one time from his pocket?

Coin Outcomes

Quarter	Dime	Nickel
Quarter	Dime	Penny
Dime	Quarter	Nickel
Nickel	Quarter	Penny
Nickel	Penny	Quarter
Penny	Nickel	Dime

F

Coin Outcomes

Quarter	Quarter	Nickel
Quarter	Quarter	Dime
Quarter	Quarter	Penny
Quarter	Dime	Penny
Quarter	Nickel	Nickel
Quarter	Nickel	Dime
Quarter	Nickel	Penny
Dime	Nickel	Penny
Nickel	Nickel	Penny
Nickel	Nickel	Dime

H

Coin Outcomes

Quarter	Penny	Quarter
Dime	Nickel	Dime
Nickel	Dime	Nickel
Penny	Quarter	Penny

G

Coin Outcomes

Quarter	Quarter	Nickel
Quarter	Quarter	Dime
Quarter	Dime	Penny
Quarter	Nickel	Nickel
Quarter	Nickel	Dime
Quarter	Penny	Penny
Dime	Quarter	Nickel
Nickel	Quarter	Dime
Nickel	Dime	Penny

J

Grade 7-2004

Objective 5: The student will demonstrate an understanding of probability and statistics.

(7.12) **Probability and statistics.** The student uses measures of central tendency and range to describe a set of data. The student is expected to

(B) choose among mean, median, mode, or range to describe a set of data and justify the choice for a particular situation.

29 Timothy collected the following data during a science experiment.

Ball Drop Times

Trial	Time (seconds)
1	18
2	11
3	15
4	11
5	13
6	11

Which measure of data is represented by 12 seconds?

- A Mean
- B Mode
- C Median
- D Range

Grade 7-2004

Objective 5: The student will demonstrate an understanding of probability and statistics.

(7.11) **Probability and statistics.** The student understands that the way a set of data is displayed influences its interpretation. The student is expected to

(B) make inferences and convincing arguments based on an analysis of given or collected data.

35 The table shows the number of blue-plate specials sold at a diner each day last week.

Blue-Plate Specials

Day of Week	Number of Orders
Saturday	95
Sunday	87
Monday	35
Tuesday	27
Wednesday	31
Thursday	39
Friday	50

Which statement is NOT supported by these data?

- A** There were almost 3 times as many orders placed on Sunday as on Wednesday.
- B** There were almost twice as many orders placed on Saturday as on Friday.
- C** The total number of orders placed on weekdays equals the number of orders placed over the weekend.
- D** The average number of orders placed per day was 42.

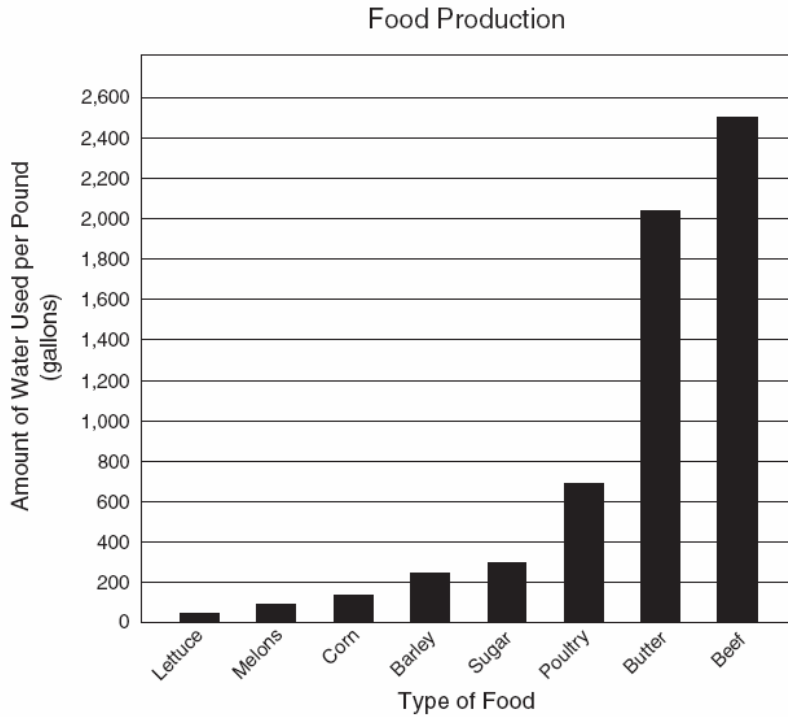
Grade 7-2004

Objective 5: The student will demonstrate an understanding of probability and statistics.

(7.11) Probability and statistics. The student understands that the way a set of data is displayed influences its interpretation. The student is expected to

(B) make inferences and convincing arguments based on an analysis of given or collected data.

36 The graph below shows the number of gallons of water used to produce a pound of various types of food.



Which statement is best supported by these data?

- F** Lettuce takes $\frac{1}{2}$ as much water to grow as melons do.
- G** Beef production uses more water than the production of all the other food combined.
- H** It takes nearly 3 times the amount of water to produce a pound of poultry as it does to produce a pound of sugar.
- J** It takes the same amount of water to produce a pound of sugar or a pound of barley.

Grade 7-2004

Objective 5: The student will demonstrate an understanding of probability and statistics.

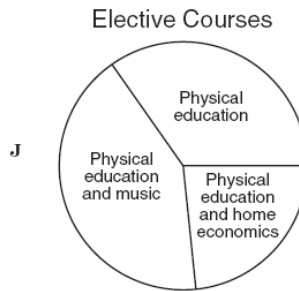
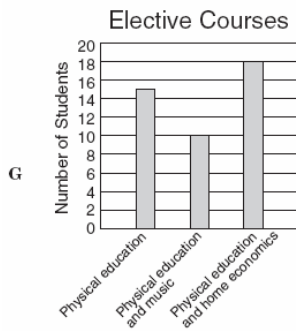
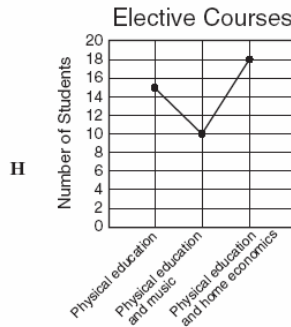
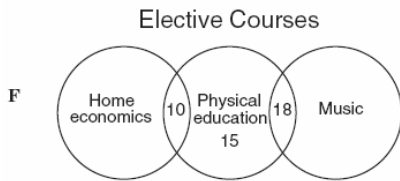
(7.11) **Probability and statistics.** The student understands that the way a set of data is displayed influences its interpretation. The student is expected to

(A) select and use an appropriate representation for presenting collected data and justify the selection;

40 A counselor at Rosetta Middle School collected the following data about students taking elective courses.

Elective Courses	
Course	Number of Students
Physical education only	15
Physical education and music	18
Physical education and home economics	10

Which graph best represents these data?



Grade 7-2004

Objective 5: The student will demonstrate an understanding of probability and statistics.

(7.12) **Probability and statistics.** The student uses measures of central tendency and range to describe a set of data. The student is expected to

(A) describe a set of data using mean, median, mode, and range;

46 Terri collected data on the number of cans donated by each homeroom in her grade for a food drive. The table below shows the results of the food drive.

Canned-Food Drive

Homeroom Teacher	Number of Cans
Mr. Campbell	45
Mrs. Padilla	63
Ms. Pogue	92
Mrs. Malmgren	27
Mr. Dawson	115
Ms. Morgan	

Which number could be added to the set of data in order for the median and mode of the set to be equal?

- F** 54
- G** 63
- H** 80
- J** 88

Grade 7-2004

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(7.13) **Underlying processes and mathematical tools.** The student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to

(A) identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics;

- 3 Mrs. Vega needed to make 2 costumes for a school play. The larger costume required $4\frac{1}{4}$ yards of material, and the smaller costume required $\frac{3}{4}$ yard less than the larger one. Which equation can be used to find n , the number of yards of material needed for the smaller costume?

A $n = 4\frac{1}{4} + \frac{3}{4}$

B $n = 4\frac{1}{4} \cdot \frac{3}{4}$

C $n = 4\frac{1}{4} \div \frac{3}{4}$

D $n = 4\frac{1}{4} - \frac{3}{4}$

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(7.13) **Underlying processes and mathematical tools.** The student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to

(B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;

- 6 An equilateral triangle is divided into 4 congruent equilateral triangles. What method can be used to find the area of the larger equilateral triangle, given the area of one of the smaller triangles?

- F Multiply the area of the larger equilateral triangle by 4
G Multiply the area of one congruent equilateral triangle by 4
H Subtract the area of one congruent triangle from the area of the larger equilateral triangle
J Add the area of the larger equilateral triangle to the areas of the 4 congruent equilateral triangles

Grade 7-2004

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(7.13) **Underlying processes and mathematical tools.** The student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to

(B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;

8 Mr. Palmer started a new business and hired 12 employees. A list of the employees and their hourly wages is shown below.

Employee Wages

Employee Number	Hourly Wage
774	\$8.25
846	\$6.85
616	\$7.25
271	\$9.15
806	\$8.95
435	\$7.25
736	\$7.25
248	\$9.15
192	\$7.50
329	\$8.60
685	\$8.25
377	\$6.95

What should Mr. Palmer do to organize the data in order to identify which employees earn less than the median hourly wage?

- F** He should add up all the hourly wages.
- G** He should list the employee numbers in order from greatest to least.
- H** He should list the hourly wages in order from least to greatest with their corresponding employee numbers.
- J** He should list the employee numbers in order from least to greatest with their corresponding hourly wages.

Grade 7-2004

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(7.14) **Underlying processes and mathematical tools.** The student communicates about Grade 7 mathematics through informal and mathematical language, representations, and models. The student is expected to

(A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.

10 Mr. Cohen used 25 kilograms of fertilizer on his lawn. The fertilizer contained 2 kilograms of nitrogen. Which equation can be used to find x , the percent of nitrogen in the fertilizer Mr. Cohen used?

F $\frac{x}{100} = \frac{2}{25}$

G $\frac{x}{100} = \frac{25}{2}$

H $\frac{x}{2} = \frac{27}{100}$

J $\frac{25}{27} = \frac{x}{100}$

Grade 7-2004

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(7.15) **Underlying processes and mathematical tools.** The student uses logical reasoning to make conjectures and verify conclusions. The student is expected to

(A) make conjectures from patterns or sets of examples and nonexamples;

13 The table below shows the favorite sports of the students at Tompkins Middle School.

Favorite Sports

Sport	Number of Students
Cycling	950
Swimming	900
Basketball	675
Volleyball	450

Based on the information in the table, which of the following is a reasonable assumption?

- A** About 3 times as many students like cycling as volleyball.
- B** Swimming is almost twice as popular as basketball.
- C** About 2 times as many students like swimming as volleyball.
- D** Volleyball is the most popular sport.

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(7.13) **Underlying processes and mathematical tools.** The student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to

(B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;

18 Hilda bought 4 orders of french fries at \$0.67 each, 3 hamburgers at \$1.28 each, and 4 shakes at \$2.25 each. She paid 8.25% tax on the whole order. What other information is necessary to find Hilda's correct change?

- F** Total cost of the order
- G** Amount she paid in tax
- H** Amount she gave the cashier
- J** Reason for buying the food

Grade 7-2004

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(7.14) **Underlying processes and mathematical tools.** The student communicates about Grade 7 mathematics through informal and mathematical language, representations, and models. The student is expected to

(A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.

23 A sports-shop owner bought some baseball cards and then sold them for \$7.50 each. He sold 150 cards on Monday and 82 cards on Tuesday. What piece of information is needed to find the amount of profit he made from the sale of the baseball cards on Monday and Tuesday?

- A How much the shop owner paid for the baseball cards
- B Number of cards sold on Wednesday
- C Total number of cards sold
- D Number of football cards bought by the shop owner

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(7.15) **Underlying processes and mathematical tools.** The student uses logical reasoning to make conjectures and verify conclusions. The student is expected to

(B) validate his/her conclusions using mathematical properties and relationships.

41 Mr. Jenkins wants to buy some rosebushes for his garden. There are four stores in his neighborhood currently having sales on rosebushes.

Rosebush Sales

Store	Sale Price
Sheldon's Plant Mart	4 rosebushes for \$11.90
Rose Mart	3 rosebushes for \$8.95
Kathleen's Roses	2 rosebushes for \$5.90
Rose Heaven	1 rosebush for \$2.96

If Mr. Jenkins wants to save as much money as possible, at which store should he shop?

- A Sheldon's Plant Mart, because he wants to buy 4 rosebushes
- B Rose Mart, because each rosebush costs almost \$3.00
- C Kathleen's Roses, because each rosebush costs \$2.95
- D Rose Heaven, because the selection is better

Grade 7-2004

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(7.13) **Underlying processes and mathematical tools.** The student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to

(A) identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics;

48 Ms. Abbot went on a road trip. The trip was 792 miles, and the average price of gasoline was \$1.30 per gallon. What information is needed to find the amount Ms. Abbot spent on gasoline for the trip?

- F** Number of hours the trip took
- G** Number of miles per hour the car traveled
- H** Average number of miles the car traveled per gallon of gasoline
- J** Average number of miles Ms. Abbot drove per day

Grade: 07
 Subject: Mathematics
 Administration: April 2004

Item Number	Correct Answer	Objective Measured	Student Expectations
01	C	01	7.2 (D)
02	G	03	7.7 (A)
03	D	06	7.13 (A)
04	G	02	7.4 (A)
05	A	03	7.6 (A)
06	G	06	7.13 (B)
07	B	04	7.9 (A)
08	H	06	7.13 (B)
09	B	03	7.6 (D)
10	F	06	7.14 (A)
11	D	04	7.9 (A)
12	J	02	7.4 (C)
13	C	06	7.15 (A)
14	H	01	7.1 (B)
15	B	03	7.6 (B)
16	F	02	7.3 (A)
17	D	04	7.9 (A)
18	H	06	7.13 (B)
19	C	02	7.4 (B)
20	F	02	7.4 (C)
21	14	04	7.9 (A)
22	H	04	7.9 (A)
23	A	06	7.14 (A)
24	F	01	7.2 (A)
25	D	02	7.3 (A)
26	H	05	7.12 (A)
27	D	01	7.2 (C)
28	H	05	7.10 (A)
29	C	05	7.12 (B)
30	G	01	7.2 (E)
31	D	01	7.1 (B)
32	F	02	7.4 (B)
33	A	01	7.1 (C)
34	J	03	7.7 (A)
35	D	05	7.11 (B)
36	F	05	7.11 (B)
37	A	02	7.5 (B)
38	H	01	7.1 (A)
39	B	03	7.8 (A)
40	F	05	7.11 (A)
41	C	06	7.15 (B)
42	G	01	7.1 (C)
43	A	03	7.7 (B)
44	J	02	7.5 (A)
45	C	01	7.2 (G)
46	G	05	7.12 (A)
47	A	02	7.3 (B)
48	H	06	7.13 (A)