

Spring 2013 Student Performance Analysis

Grade 8 Mathematics Standards of Learning



Presentation may be paused and resumed using the arrow keys or the mouse.

Compare and Order Decimals, Fractions, Percents, and Numbers Written in Scientific Notation

SOL 8.1

The student will

- a) simplify numerical expressions involving positive exponents, using rational numbers, order of operations, and properties of operations with real numbers; and
- b) compare and order decimals, fractions, percents, and numbers written in scientific notation.

Suggested Practice for SOL 8.1b

Students need additional practice comparing and ordering percents, decimals, mixed numbers, and numbers written in scientific notation.

a) Select each number that is between 510% and 7.432×10^0 .

5.15

$7\frac{5}{6}$

0.059×10^2

0.45

$\frac{22}{3}$

b) Identify the number with the smallest value.

0.632

$\frac{16}{25}$

62%

6.13×10^{-1}

Recognizing Subsets of the Real Number System

SOL 8.2

The student will describe orally and in writing the relationships between the subsets of the real number system.

Suggested Practice for SOL 8.2

Students need additional practice identifying natural numbers from a list of numbers.

Identify each natural number from the list of numbers.

a) $\frac{18}{2}$, 0, $3\frac{1}{3}$, -13 , $\frac{2}{7}$, 6.0

b) -2 , $\frac{12}{5}$, $\sqrt{81}$, $\frac{57}{3}$, $\frac{1}{3}$, 1

Solving Practical Problems Involving Decimals, Information Presented as Graphs, and Percent Increase and Decrease

SOL 8.3

The student will

- a) solve practical problems involving rational numbers, percents, ratios, and proportions; and
- b) determine the percent increase or decrease for a given situation.

Suggested Practice for SOL 8.3a

Students need additional practice solving practical problems involving computation procedures with decimals.

Kimberly wants to buy a new television for her mother.

- **The cost of the television is \$276.45, including tax.**
- **She has \$90 saved.**
- **She will babysit for three months to save the remaining amount of money needed to buy the television.**
- **She will earn the same amount of money each month.**

How much money must Kimberly earn each month to save the exact remaining amount needed?

\$ 62.15

Suggested Practice for SOL 8.3a

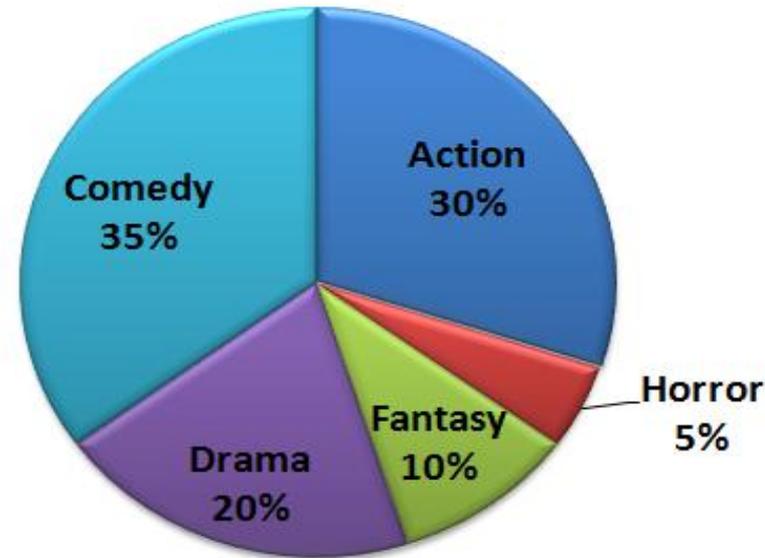
Students need additional practice solving practical problems when information is represented as percentages in a graph.

Dedra polled people at the mall to determine which types of movies they preferred to watch. She displayed the results in a circle graph.

Of the people polled, 84 preferred to watch comedies. Use this information and the graph to answer these questions.

- a) What is the total number of people Dedra polled? **240**
- b) What is the total number of people that preferred:
 - i. Horror **12**
 - ii. Drama **48**

Types of Movies

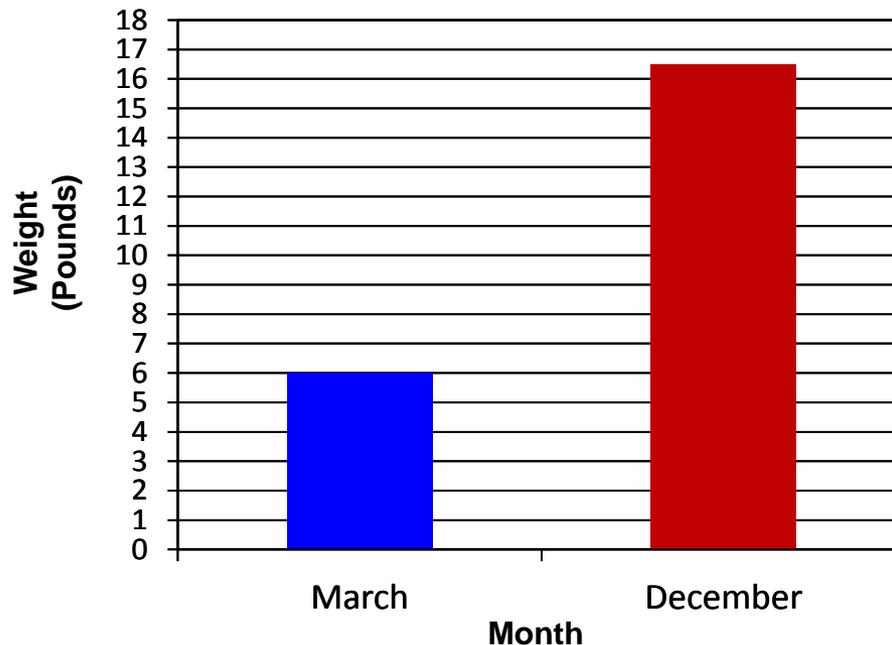


Suggested Practice for SOL 8.3b

Students need additional practice solving practical problems involving percent increase and decrease.

Cayley's mom made a graph to represent Cayley's weight in March and in December. Cayley weighed a total of 6 pounds in March. Her weight increased by 175% from March to December. Complete the graph to show Cayley's weight in December.

Cayley's Weight



Suggested Practice for SOL 8.3b

The price of a video gaming system was \$259. The price decreased to \$199. What is the percent decrease in the price of this system? Round your answer to the nearest whole percentage.

23%

Identifying Angle Relationships

SOL 8.6

The student will

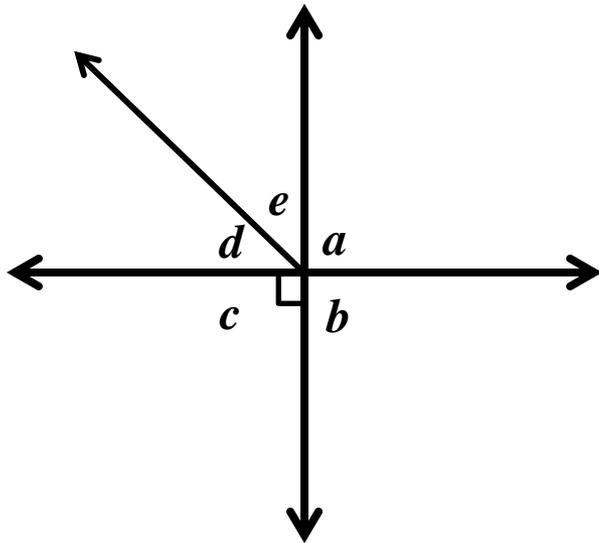
- a) **verify by measuring and describe the relationships among vertical angles, adjacent angles, supplementary angles, and complementary angles; and**
- b) **measure angles of less than 360° .**



Suggested Practice for SOL 8.6a

Students need additional practice identifying angle relationships among multiple angles.

Name pairs of vertical, adjacent, supplementary, and complementary angles.



Vertical Angles

a and c

Supplementary Angles

a and b

b and c

a and c

Complementary Angles

e and d

Adjacent Angles

a and b

b and c

c and d

d and e

a and e

Solving Practical Problems Involving Surface Area

SOL 8.7

The student will

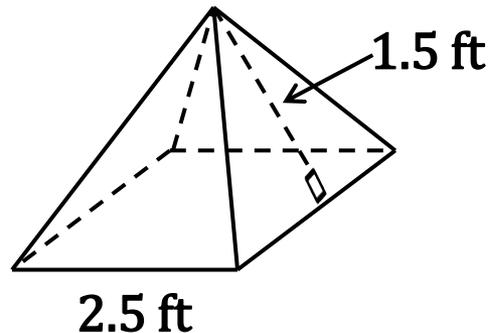
- a) investigate and solve practical problems involving volume and surface area of prisms, cylinders, cones, and pyramids; and
- b) describe how changing one measured attribute of a figure affects the volume and surface area.



Suggested Practice for SOL 8.7a

Students need additional practice determining surface area of a square-based pyramid.

Timothy built a wooden square-based pyramid for a history class project on Egypt. He needs to buy enough gold paper to cover the entire surface. The base length is 2.5 ft and the slant height is 1.5 ft.



What is the minimum amount of gold paper he needs to purchase?

13.75 sq ft



Determining the Coordinates of a Figure After a Transformation

SOL 8.8

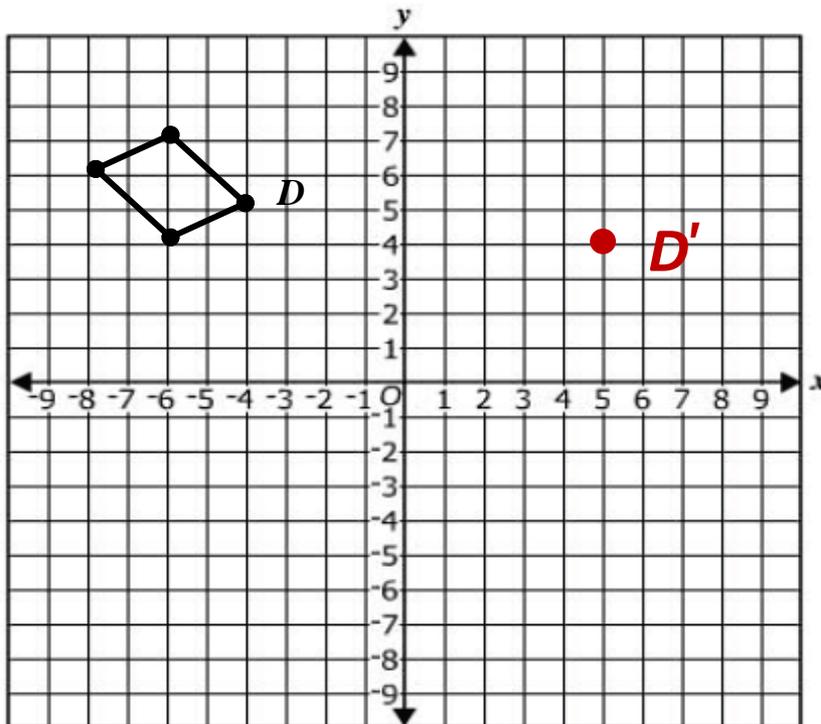
The student will

- a) apply transformations to plane figures; and**
- b) identify applications of transformations.**

Suggested Practice for SOL 8.8a

Students need additional practice determining the coordinates of a figure after it is rotated about the origin in the counterclockwise direction.

This polygon is rotated 270° counterclockwise about the origin. Plot the image of point D $(-4,5)$ and name the coordinates.



(5, 4)

Identifying a Figure When Given Three Views

SOL 8.9

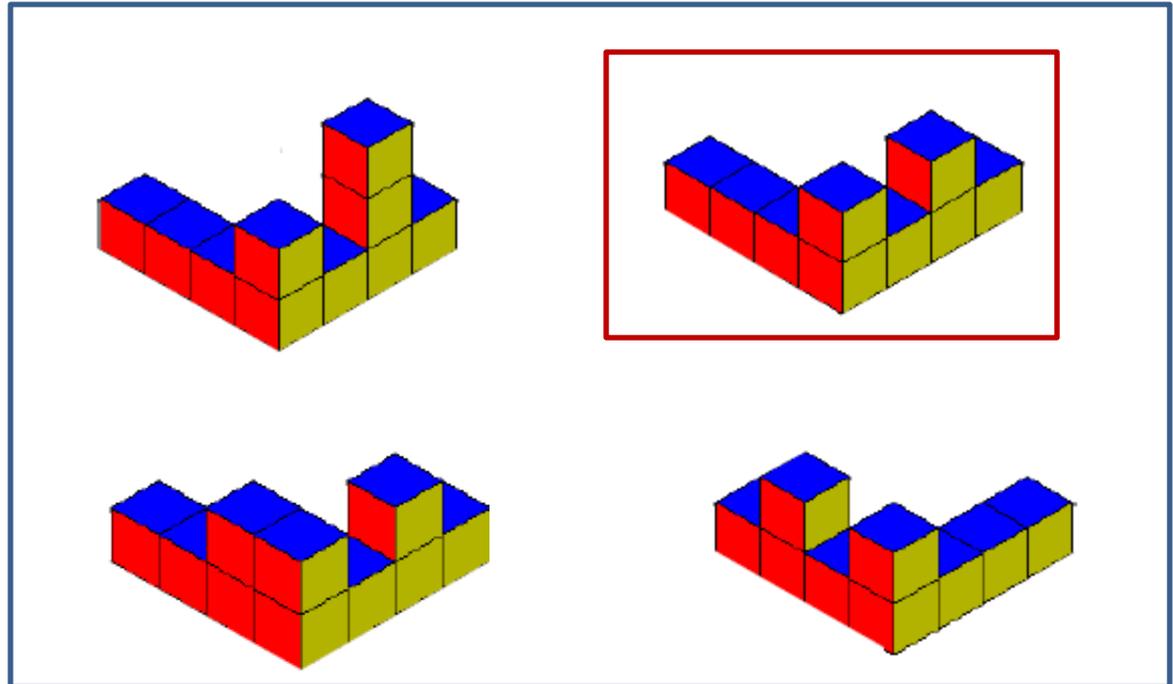
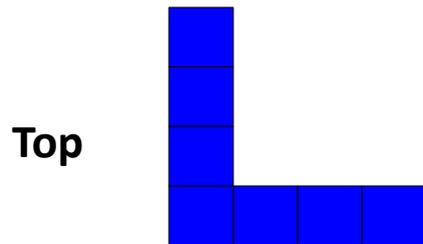
The student will **construct a three-dimensional model, given the top or bottom, side, and front views.**



Suggested Practice for SOL 8.9

Students need additional practice using the top or bottom, side, and front views to determine which figure is represented.

A three-dimensional figure was constructed using identical cubes. The top-, front-, and left-side views of this figure are shown. Which could be this figure?



Finding the Area and Perimeter of Composite Figures

SOL 8.11

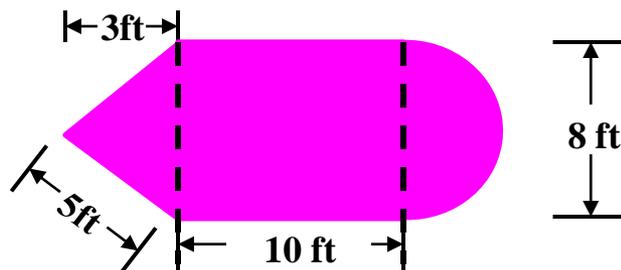
The student will solve practical area and perimeter problems involving composite plane figures.



Suggested Practice for SOL 8.11

Students need additional practice finding the area and perimeter of composite figures.

Bobby is painting a figure on a banner for a homecoming parade. The figure he is painting consists of an isosceles triangle, a rectangle, and a semicircle, as shown.



a) What is the total area of the figure, rounded to the nearest tenth?
117.1 sq ft

b) What is the total perimeter of the figure, rounded to the nearest tenth?
42.6 ft



Determining the Probability of Independent and Dependent Events

SOL 8.12

The student will determine the probability of independent and dependent events with and without replacement.



Suggested Practice for SOL 8.12

Students need additional practice finding the probability of events, with and without replacement.

Ms. Wright has a box of markers that are all the same shape and size that she uses to write on the board. There are 4 red markers, 3 green markers, and 8 black markers.

- a) What is the probability that Ms. Wright will select a red marker, put it back in the box, and then select a green marker?

$$\frac{4}{15} \cdot \frac{3}{15} = \frac{12}{225} = \frac{4}{75}$$

- b) Ms. Wright is passing out markers to her students. What is the probability that she first selects a black marker, does not replace it, and then selects a red marker?

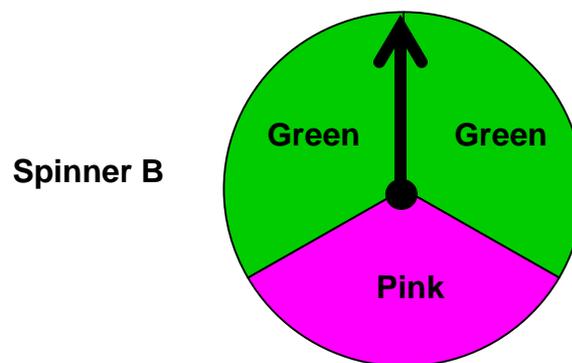
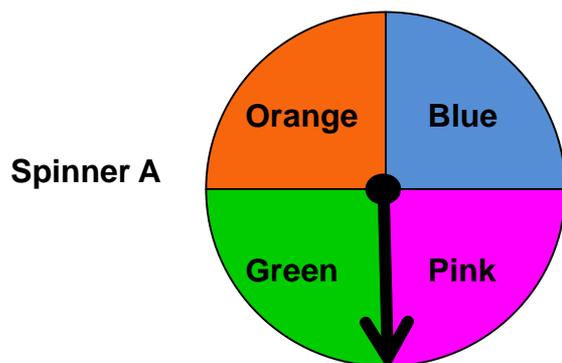
$$\frac{8}{15} \cdot \frac{4}{14} = \frac{32}{210} = \frac{16}{105}$$



Suggested Practice for SOL 8.12

Students need additional practice finding the probability of two independent events.

Clinton has two spinners. Spinner A has 4 congruent sections and Spinner B has 3 congruent sections as shown.



Clinton will spin these two spinners at the same time.

- a) What is the probability that both spinners will land on a color that is NOT pink?

$$\frac{3}{4} \cdot \frac{2}{3} = \frac{6}{12} = \frac{1}{2}$$

- b) What is the probability that Spinner A will land on orange and spinner B will land on green?

$$\frac{1}{4} \cdot \frac{2}{3} = \frac{2}{12} = \frac{1}{6}$$

Using Information Displayed in Graphs and Analyzing Scatterplots

SOL 8.13

The student will

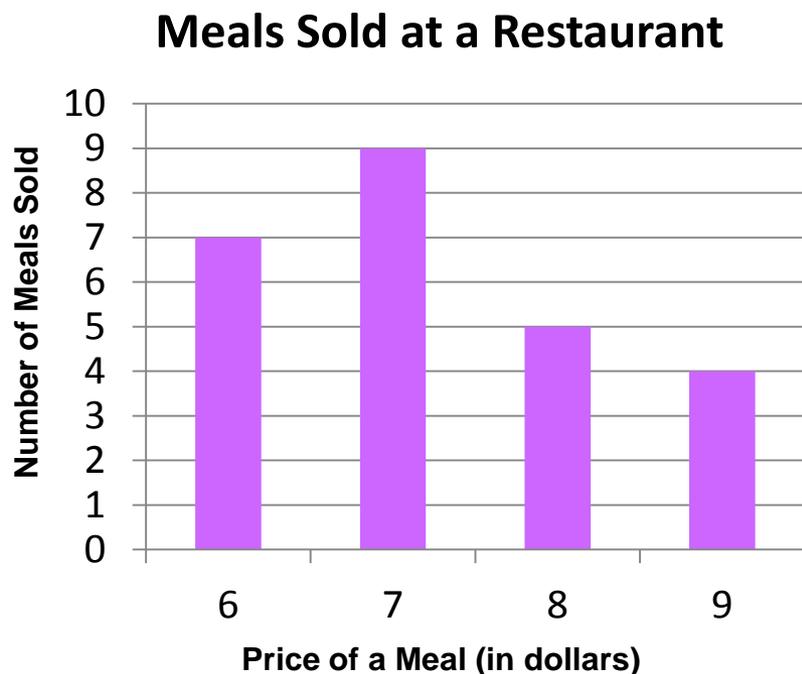
- a) make comparisons, predictions, and inferences, using information displayed in graphs; and
- b) construct and analyze scatterplots.



Suggested Practice for SOL 8.13a

Students need additional practice using data represented in a graph to make inferences or answer questions.

The numbers and prices of meals sold at a restaurant are represented in the graph.



Based on the information in the graph:

a) What is the mean price of all of the meals sold?

\$7.24

b) What is the median price of all the meals sold?

\$7.00

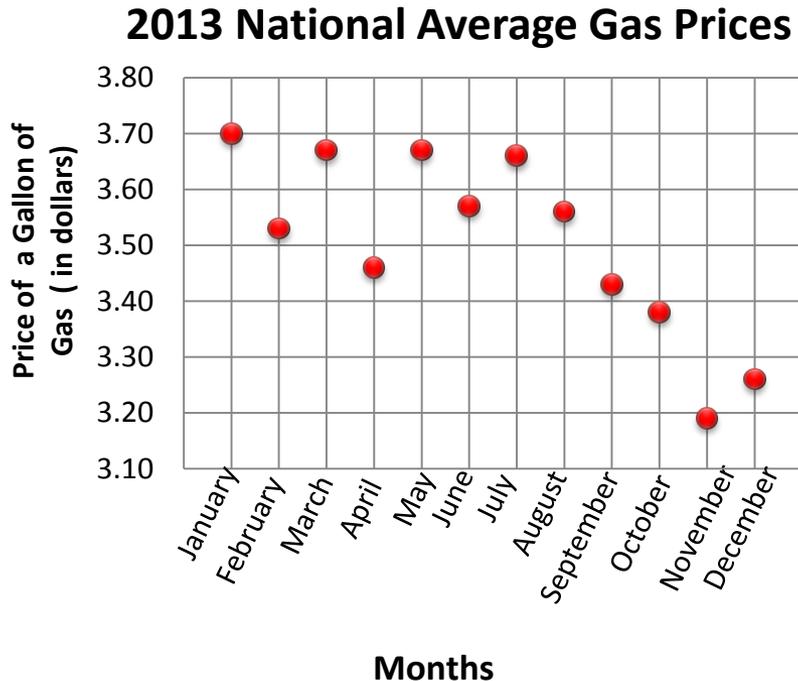
c) What is the total number of meals costing more than 7 dollars?

9



Suggested Practice for SOL 8.13b

This scatterplot shows the average price of a gallon of gas during each month in 2013. Which statement best describes the gas prices as the months progress from January to December?



- a) the graph shows a positive relationship for the average price of a gallon of gas
- b) the graph shows a negative relationship for the average price of a gallon of gas**
- c) the graph shows the average price of a gallon of gas remains constant
- d) the graph shows no relationship between the average price of a gallon of gas and the months



Making Connections Between Representations of a Relationship

SOL 8.14

The student will make connections between any two representations (tables, graphs, words, and rules) of a given relationship.



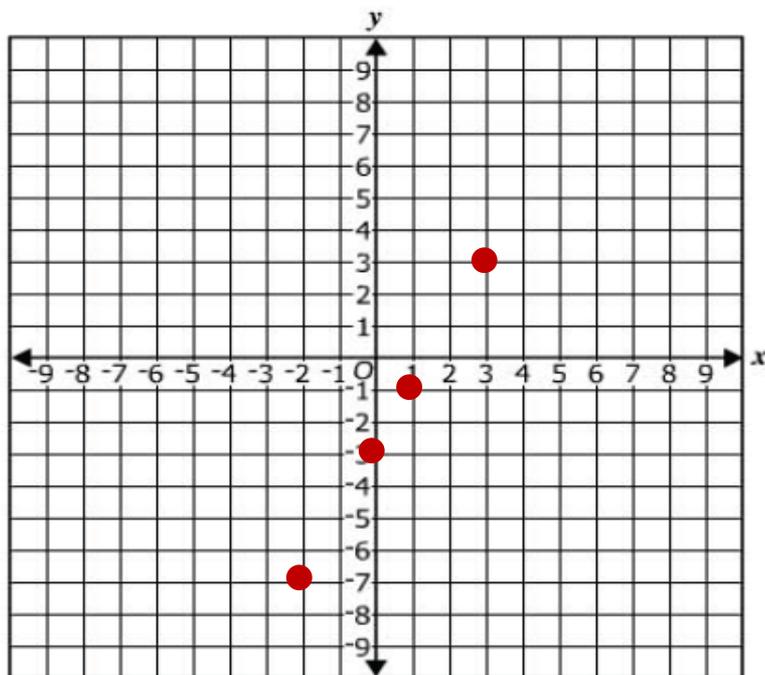
Suggested Practice for SOL 8.14

Students need additional practice making connections between any two representations of a given relationship.

Use the table to answer questions a, b and c.

x	-2	0	1	3
y	-7	-3	-1	3

a) Plot the ordered pairs in the table on the coordinate plane.



b) Use words to describe the relationship found in the table.

Possible answer:

y is equal to the product of 2 and a number x decreased by 3

c) Write an equation for the relation that includes the ordered pairs in the table.

Possible answer:

$$y = 2x - 3$$



Solving Equations and Inequalities

SOL 8.15

The student will

- a) solve multistep linear equations in one variable on one and two sides of the equation;
- b) solve two-step linear inequalities and graph the results on a number line; and
- c) identify properties of operations used to solve an equation.

Suggested Practice for SOL 8.15a

Students need additional practice solving multistep equations.

Solve each equation.

a) $\frac{x+4}{2} - 3 = 19$ $x = 40$

b) $-2x + 5 = -25$ $x = 15$

c) $9x = 27x - 2$ $x = \frac{1}{9}$



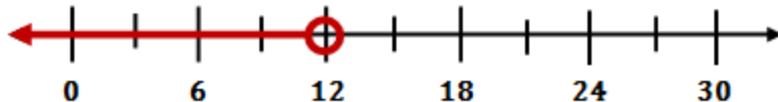
Suggested Practice for SOL 8.15b

Students need additional practice solving two-step linear inequalities and graphing the solutions on a number line.

Solve and graph the inequality.

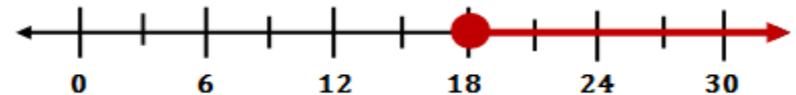
a) $\frac{n}{3} + 5 < 9$

$n < 12$



b) $-15.6 \geq -1.3x + 7.8$

$18 \leq x$



Suggested Practice for SOL 8.15c

Students need additional practice identifying the properties of operations used to solve an equation.

Select each equation that shows the use of the commutative property of multiplication.

$$-3(x - 4) = -3x + 12$$

$$(3y \cdot 2)x = 3y(2 \cdot x)$$

$$3 \cdot 2 = 2 \cdot 3$$

$$3y + 2 - y = 2y + 2$$

$$3 \cdot y \cdot 2 \cdot x = 3 \cdot y \cdot x \cdot 2$$



Suggested Practice for SOL 8.15c

Students need additional practice identifying the properties of operations used to solve an equation.

Joanna was given the equation $3x + (12 + 5x) = 36$ to solve. The first five steps she used to solve the equation are shown.

$$\text{Step 1: } 3x + (12 + 5x) = 36$$

$$\text{Step 2: } (12 + 5x) + 3x = 36$$

$$\text{Step 3: } 12 + (5x + 3x) = 36$$

$$\text{Step 4: } 12 + (8x) = 36$$

$$\text{Step 5: } 12 + (-12) + (8x) = 36 + (-12)$$

- a) Between which two steps is the commutative property of addition applied? **Step 1 and Step 2**
- b) Between which two steps is the associative property of addition applied? **Step 2 and Step 3**

Graphing Linear Equations

SOL 8.16

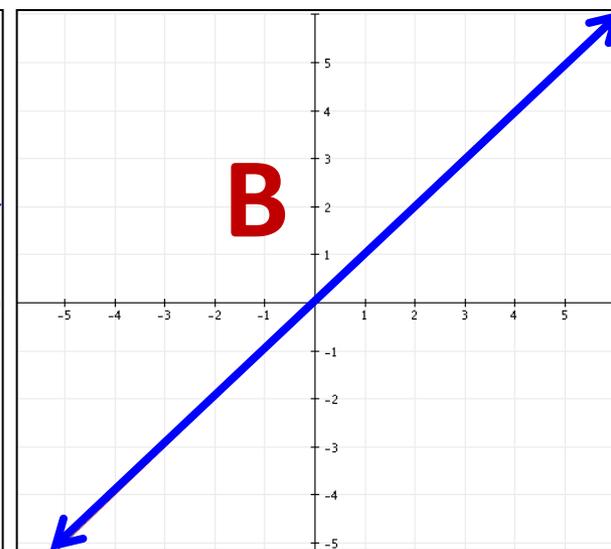
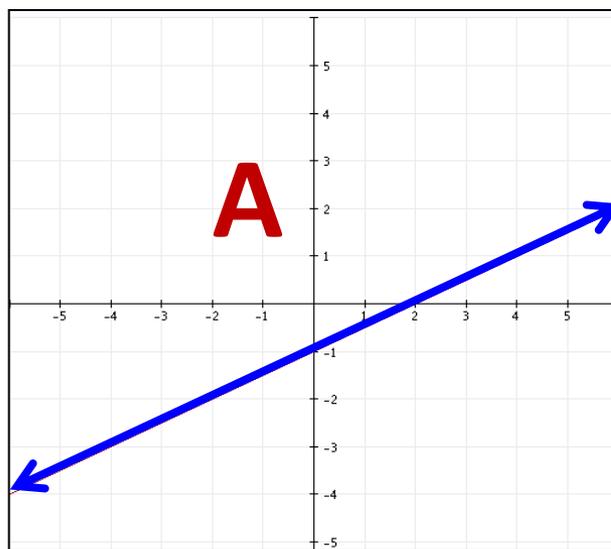
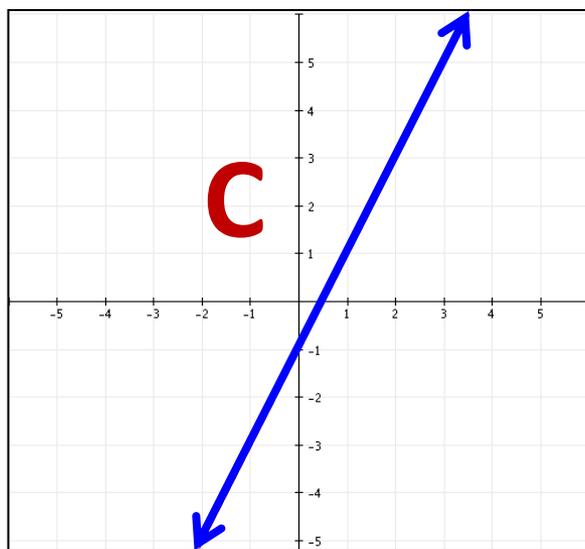
The student will **graph a linear equation in two variables.**



Suggested Practice for SOL 8.16

Students need additional practice determining corresponding graphs and equations.

Identify the equation that best represents the graph.



Equation A $y = \frac{1}{2}x - 1$

Equation B $y = x$

Equation C $y = 2x - 1$



Determining the Domain, Range, Independent Variable, or Dependent Variable

SOL 8.17

The student will identify the domain, range, independent variable, or dependent variable in a given situation.



Suggested Practice for SOL 8.17

Students need additional practice determining the domain and range of a relation from a set of points.

Determine the domain and range of each relation.

a)

x	y
-5	1
-3	8
0	6
4	-9

b) $\{(-7,3), (-2,2), (0,1), (5,9)\}$

Domain: $\{-7, -2, 0, 5\}$

Range: $\{1, 2, 3, 9\}$

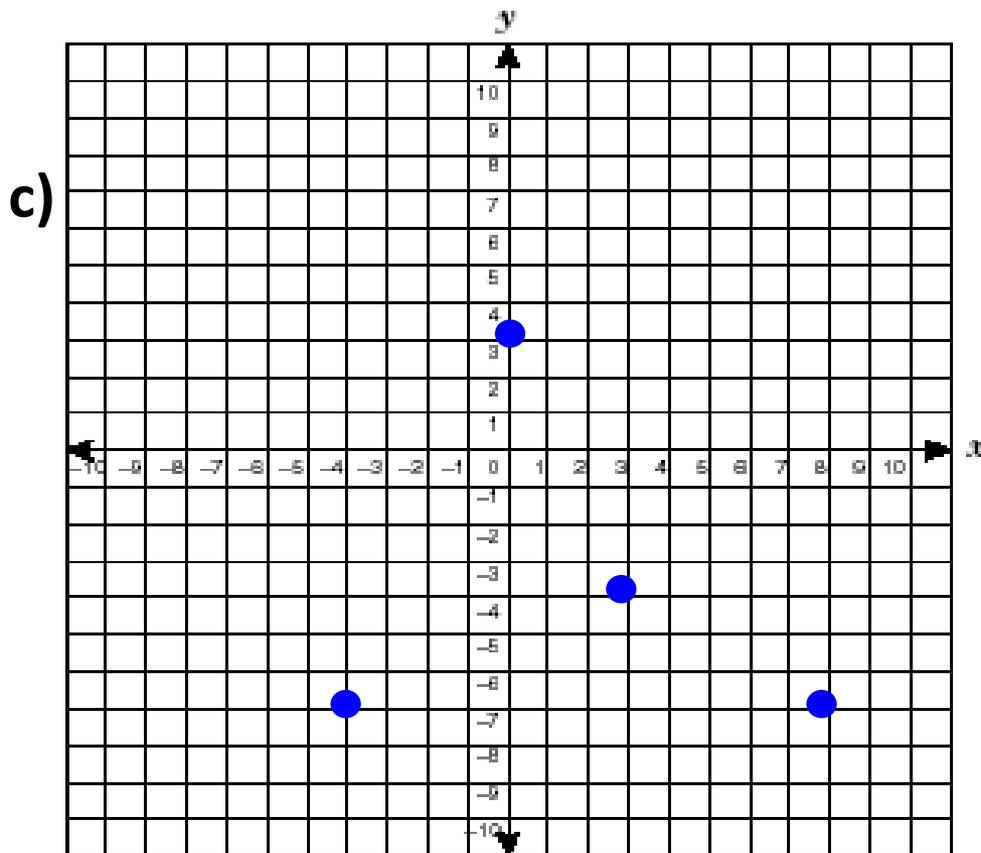
Domain: $\{-5, -3, 0, 4\}$

Range: $\{-9, 1, 6, 8\}$



Suggested Practice for SOL 8.17

Identify the domain and range of each relation.



Domain: $\{-4, 0, 3, 8\}$
Range: $\{-7, -4, 3\}$



Suggested Practice for SOL 8.17

Students need additional practice recognizing a relation with a given range.

Select each relation that has a range of $\{-5, 0, 4, 7\}$.

$\{(6, -5), (-11, 0), (6, 4), (-3, 7), (2, 9)\}$

$\{(4, 2), (0, 6), (-5, 12), (7, 6), (4, -3)\}$

$\{(6, -5), (-2, 4), (4, 7), (1, 0)\}$

$\{(0, 6), (-5, 12), (7, 6), (4, -3)\}$

$\{(-5, 4), (-5, 0), (-5, 7)\}$

$\{(18, 4), (-1, 0), (-3, -5), (6, 7), (2, 4)\}$



Suggested Practice for SOL 8.17

Students need additional practice identifying the dependent variable and independent variable in a practical problem.

Determine the dependent variable and independent variable in each situation.

- a) Brianna is saving the money she earns babysitting to buy a present for her mother. The more hours she babysits, the more money she earns.

Dependent Variable: The money she earns

Independent Variable: The number of hours she babysits

- b) Makayla has a basket of yarn she uses to knit scarves. As she finishes knitting scarves, she has less yarn in her basket.

Dependent Variable: The amount of yarn in her basket

Independent Variable: The number of scarves she finishes



Practice Items

This concludes the student performance information for the spring 2013 Grade 8 Mathematics SOL test.

Additionally, test preparation practice items for Grade 8 Mathematics can be found on the Virginia Department of Education Web site at:

http://www.doe.virginia.gov/testing/sol/practice_items/index.shtml#math



Contact Information

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