

Spring 2014 Student Performance Analysis

Grade 8 Mathematics Standards of Learning



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

Order of Operations; Comparing and Ordering 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 8.1a

Students need additional practice simplifying expressions involving a variety of grouping symbols using the order of operations.

What is the value of the expression shown?

1. $\frac{\sqrt{225}}{5} + |-10 + 6|$ **7**

Common error

$$\frac{15}{5} + (-4)$$

2. $\frac{|-4 - 20|}{8} + \sqrt{121}$ **14**

Common error

$$\frac{-24}{8} + 11$$

Suggested Practice for SOL 8.1b

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

1. Arrange the numbers from greatest to least.

9.1×10^2	918%	$\frac{1830}{2}$	920.0
920.0	$\frac{1830}{2}$	9.1×10^2	918%

2. Arrange the numbers from least to greatest.

65%	$\frac{2}{3}$	6.04×10^{-1}	6.40
6.04×10^{-1}	65%	$\frac{2}{3}$	6.40

Solving Practical Problems; Percent Increase or 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 multistep practical problems involving decimals and percents.

1. Sasha buys 2.25 pounds of ham for \$4.96 per pound and 1.7 pounds of cheese for \$2.30 per pound. Sasha gives the clerk \$20.00. If there is no sales tax on these items, how much change should she receive? **\$4.93**
2. Robert bought a pair of shoes that was on sale for 30% off the original price of \$79.95. Which is closest to the sale price of the pair of shoes?

A	\$23.99	C	\$79.65
B	\$55.97	D	\$103.94

Suggested Practice for SOL 8.3a

3. A librarian knows that 45% of the books currently checked out will NOT be returned on the due date. The library has a total of 5,040 books. How many of the library's books will be returned on the due date?

2,772

Suggested Practice for SOL 8.3b

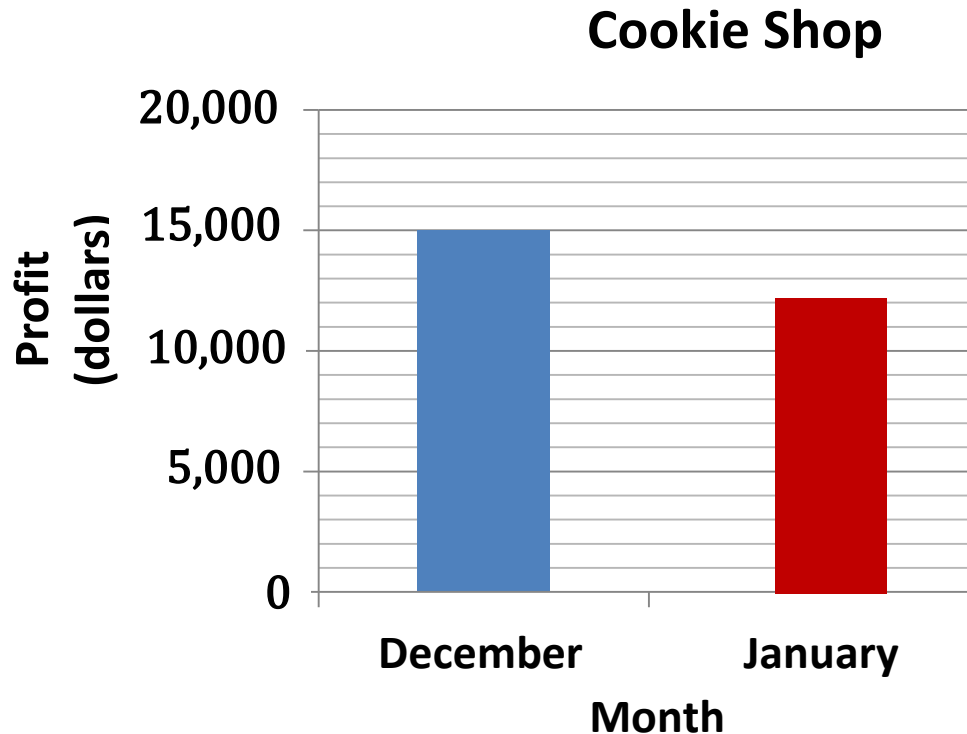
Students need additional practice solving practical problems involving percent increase or decrease.

Maggie has been exercising by climbing steps. Her climbing rate at the end of week 1 was 25 steps per minute. At the end of week 4, Maggie's rate was 60 steps per minute. What is the percent increase in Maggie's rate of climbing steps from the end of week 1 to the end of week 4?

140%

Suggested Practice for SOL 8.3b

At the end of December, the Cookie Shop had a profit of \$15,000. At the end of January, their profit had decreased by 20%. Draw a bar on the graph to represent the Cookie Shop's profit at the end of January. **\$12,000**



Pythagorean Theorem

SOL 8.10

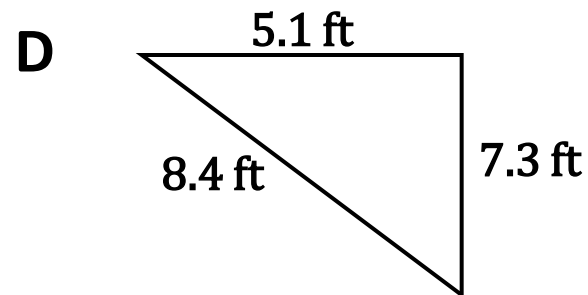
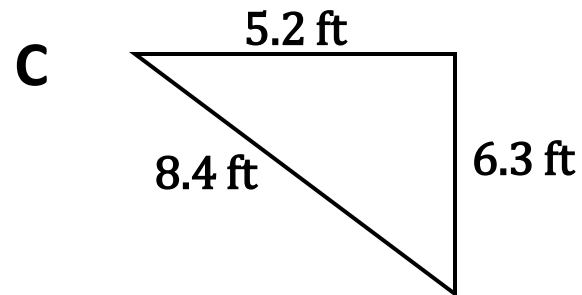
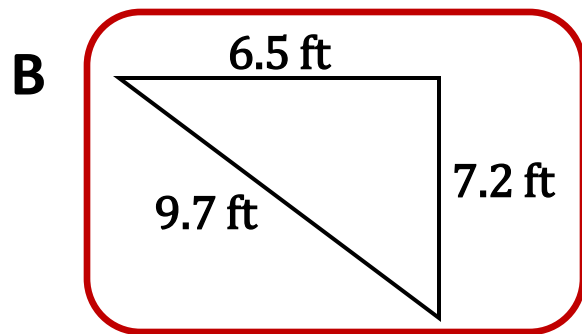
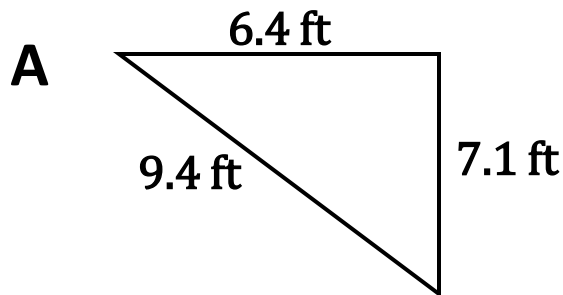
The student will

- a) verify the Pythagorean Theorem; and
- b) apply the Pythagorean Theorem.

Suggested Practice for SOL 8.10a

Students need additional practice on problems that require them to verify the Pythagorean Theorem.

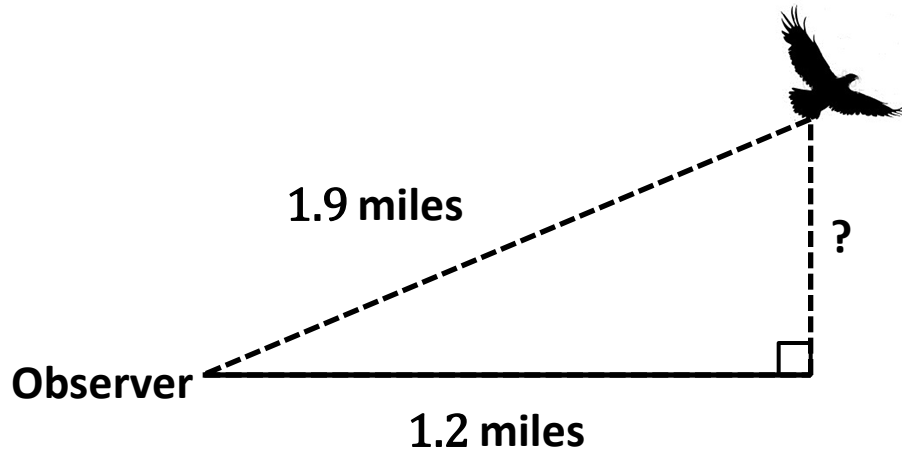
These triangles are not drawn to scale. Which triangle is a right triangle?



Suggested Practice for SOL 8.10b

Students need additional practice finding the length of a missing side of a right triangle in a real world context problem.

An observer is watching a bird from the ground as shown.



$$\begin{aligned}1.9^2 &= 1.2^2 + x^2 \\1.9^2 - 1.2^2 &= x^2 \\2.17 &= x^2 \\1.5 &\approx x\end{aligned}$$

What is the bird's distance from the ground, in miles, as shown in the diagram? Round the distance to the nearest tenth.

1.5 miles

Area and Perimeter of Composite Figures

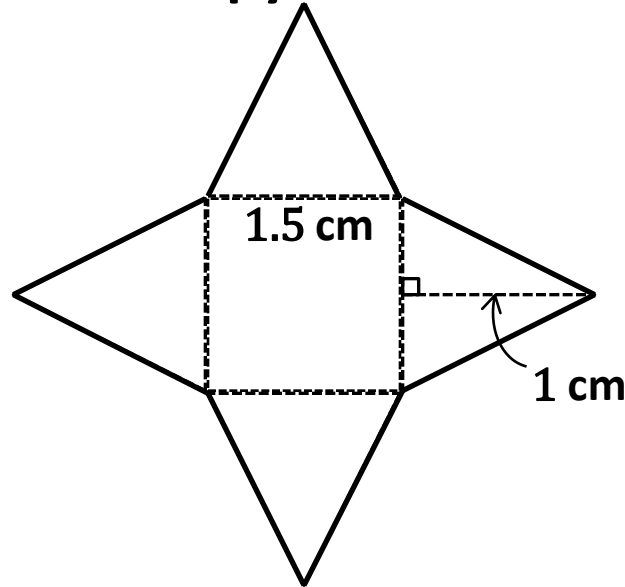
SOL 8.11

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.

The net of a square-based pyramid is shown.

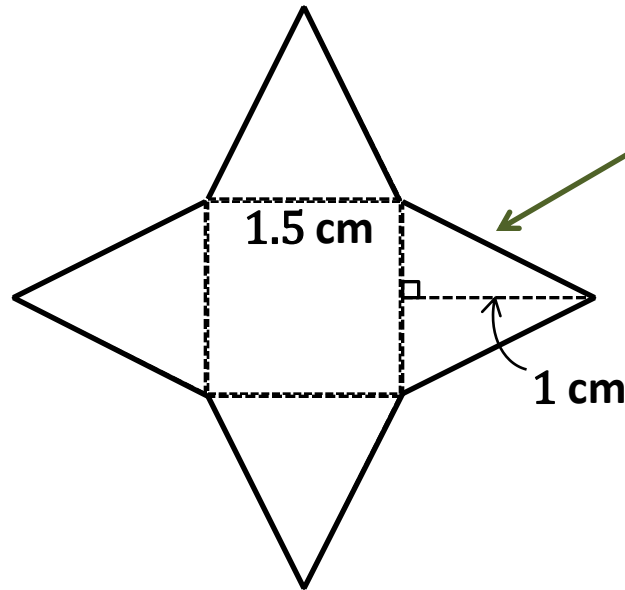


What is the area of this net?

5.25 cm²

Suggested Practice for SOL 8.11

The net of a square-based pyramid is shown.



$$\begin{aligned}1^2 + 0.75^2 &= x^2 \\1.5625^2 &= x^2 \\1.25 &= x\end{aligned}$$

What is the perimeter of this net?

$$1.25 \text{ cm} (8) = 10 \text{ cm}$$

10 cm

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 determining the probability of dependent and independent events.

Cynthia has 14 roses in a vase.

- 2 yellow roses
- 5 pink roses
- 3 white roses
- 4 red roses

Cynthia will randomly select 2 roses from the vase with no replacement. What is the probability that Cynthia will select a red rose and then a pink rose?

$$\frac{10}{91}$$

Suggested Practice for SOL 8.12

Eric and Sue will randomly select from a treat bag containing 6 lollipops and 4 gum balls.

- Eric will select a treat, replace it, and then select a second treat.

$$\frac{6}{10} \cdot \frac{4}{10} = \frac{24}{100} = \frac{6}{25}$$

- Sue will select a treat, not replace it, and then select a second treat.

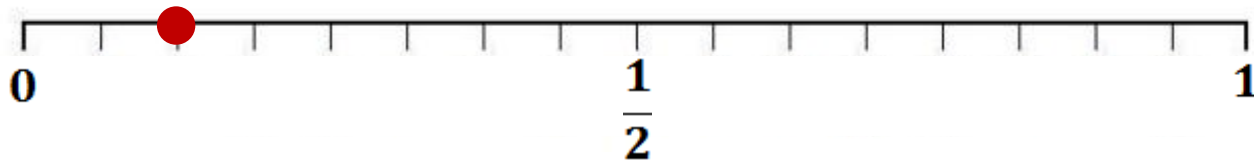
$$\frac{6}{10} \cdot \frac{4}{9} = \frac{24}{90} = \frac{4}{15}$$

Who has the greater probability of selecting 1 lollipop and then 1 gum ball?

Sue because $\frac{4}{15} > \frac{6}{25}$

Suggested Practice for SOL 8.12

Mario rolls a fair number cube with faces labeled 1 through 6 three times. Place a point on the number line to represent the probability that the number landing face up will be an even number all three times.



Using Information Displayed in Graphs

SOL 8.13

The student will

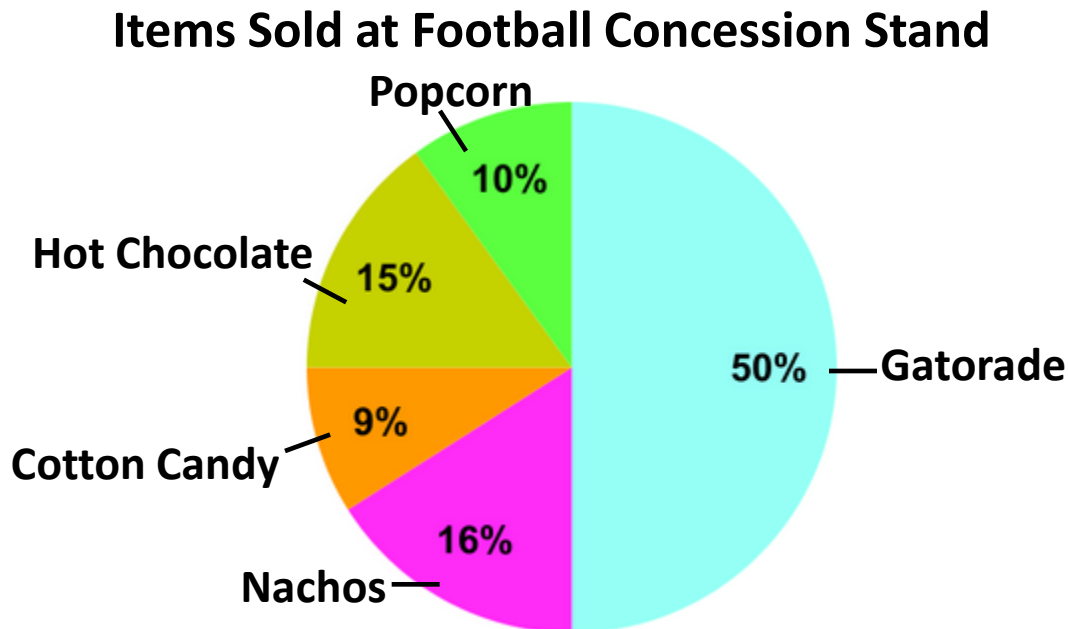
- a) make comparisons, predictions, and inferences, using information displayed in graphs; and
- b) construct and analyze scatterplots.

Suggested Practice for SOL 8.13a

Students would benefit from experiences with data represented in a variety of graphical forms.

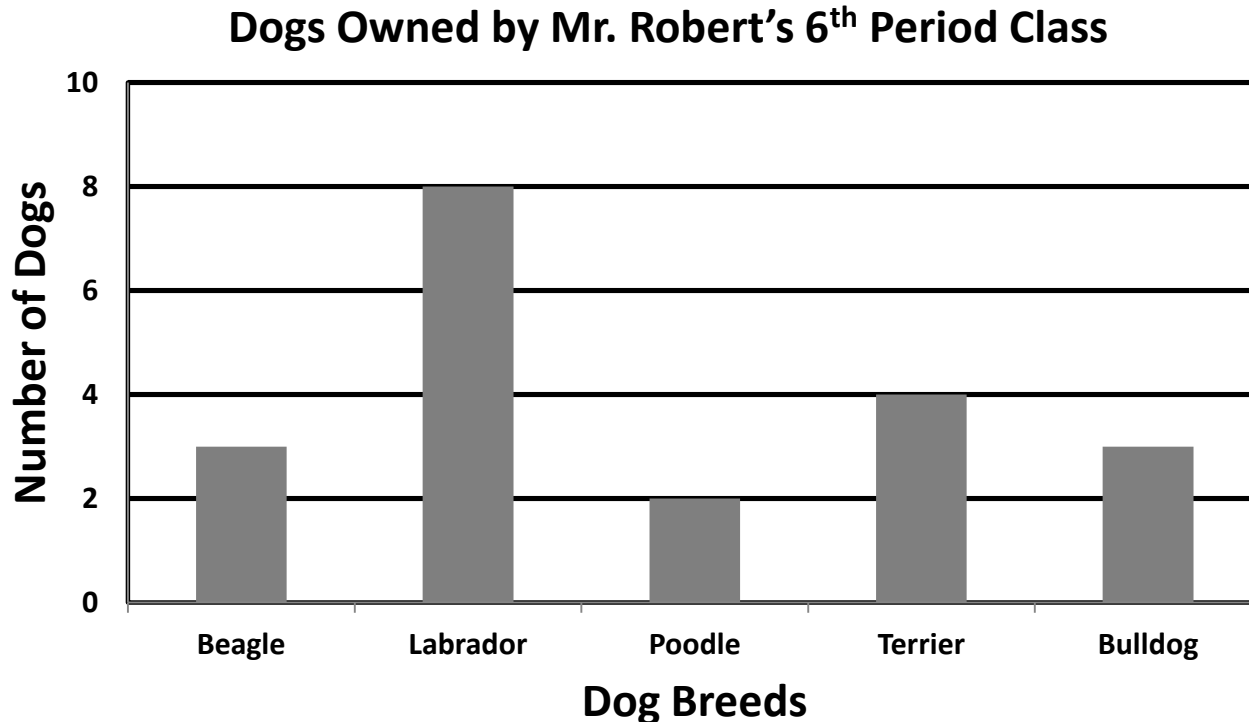
The circle graph displays the items sold at the football concession stand.

The concession stand sold a total of 450 items. How many more nachos were purchased than popcorn? **27**



Suggested Practice for SOL 8.13a

Mr. Robert took a survey of his sixth period class to determine what breeds of dogs the students have as pets. The results are shown in this graph.



What percentage of the dogs owned by Mr. Robert's class are a beagle or a terrier? **35%**

Solving 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 8.15b

Students need additional practice solving two-step linear inequalities.

What is the solution to this inequality?

$$-10.5 - 7x > -4.5$$

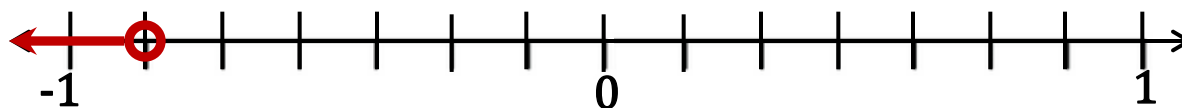
A $x < -\frac{6}{7}$

C $x > \frac{15}{7}$

B $x > -\frac{6}{7}$

D $x < \frac{15}{7}$

Graph the solution to the inequality on the number line.

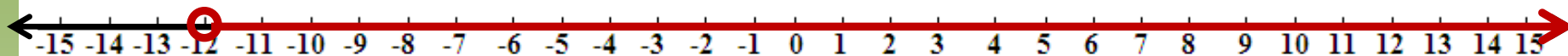


Suggested Practice for SOL 8.15b

Solve this inequality for x and graph the solution on the number line.

$$2 < \frac{x}{4} + 5$$

$$-12 < x \text{ or } x > -12$$



Suggested Practice for SOL 8.15c

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

Eric solved the equation $x - 3 = 10$ as shown.

Step 1: $x - 3 = 10$

Step 2: $x - 3 + 3 = 10 + 3$

Step 3: $x - 0 = 10 + 3$

Step 4: $x = 10 + 3$

Step 5: $x = 13$

What property justifies Eric's work from Step 2 to Step 3?

Inverse Property of Addition

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 missing table values.

Alana is creating a table of values to graph the equation $2x + 3y = 9$.

x	y
-3	?
0	3
3	1

What is the missing y -value?

A -5

B -1

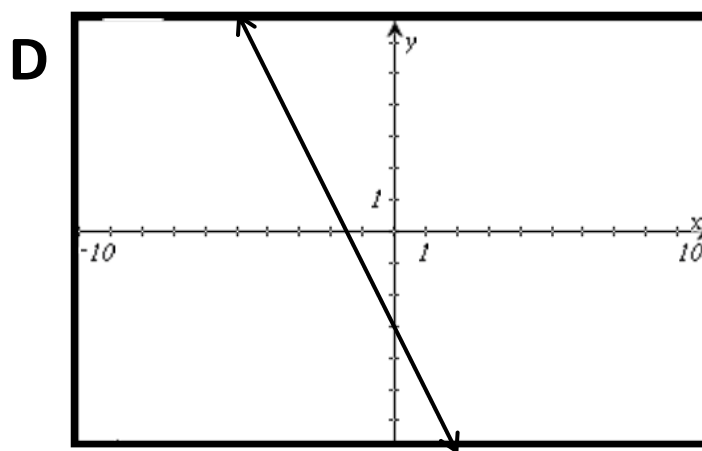
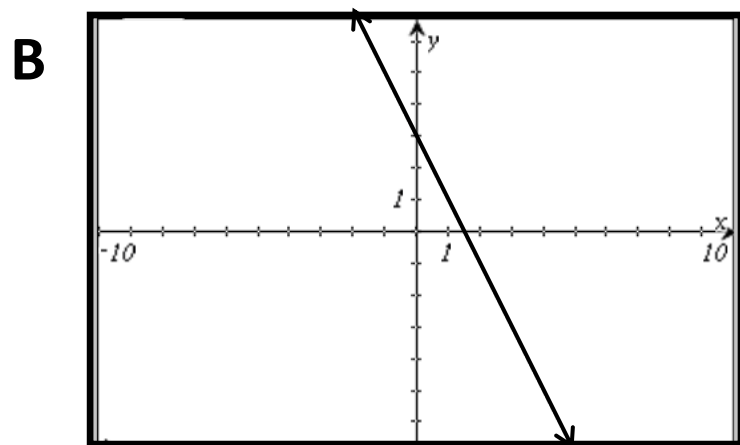
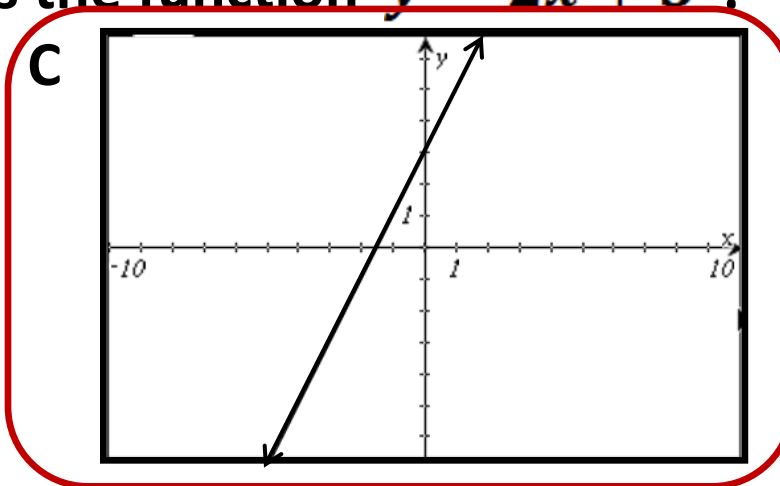
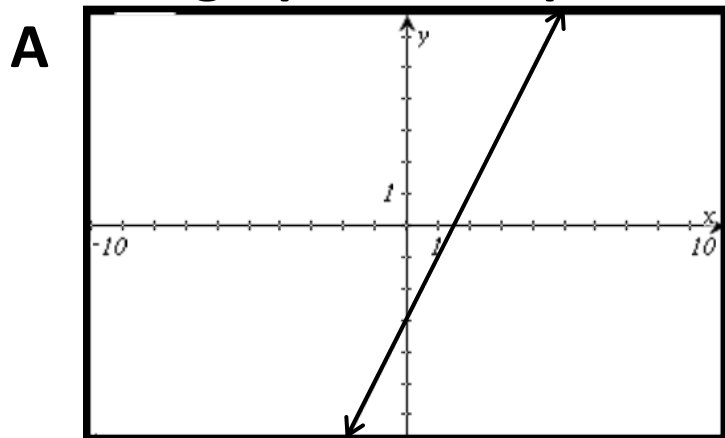
C 1

D 5

Suggested Practice for SOL 8.16

Students need additional practice identifying the graph represented by a linear equation.

Which graph best represents the function $y = 2x + 3$?



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

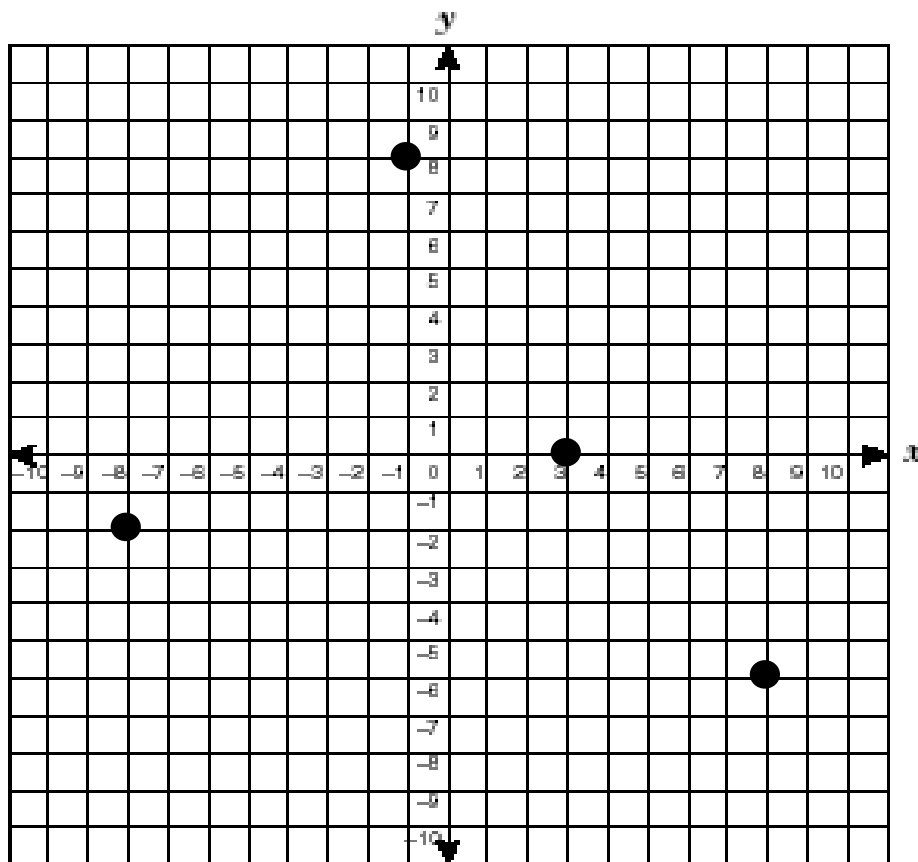
SOL 8.17

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 presented graphically.

What are the domain and range of this relation?



Domain: $\{-8, -1, 3, 8\}$

Range: $\{-6, -2, 0, 8\}$

Suggested Practice for SOL 8.17

Students need additional practice determining the domain or range when given an equation and a set of values.

What is the range of $y = -3x + 1$ for the domain of $\{2, 8\}$?

$$\{-23, -5\}$$

Suggested Practice for SOL 8.17

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

Determine the independent and dependent variable in each situation.

- a) Sarah has hired a contractor to replace the windows in her house. The more people that work, the less time it takes to install the windows.
Dependent: The time to install the windows
Independent: The number of people that work
- b) Leon sells ice cream cones in the park. He has observed that when the outside temperature exceeds ninety degrees, he sells more ice cream cones.

Dependent: The number of ice cream cones sold
Independent: The outside temperature

Practice Items

This concludes the student performance information for the spring 2014 Grade 8 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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