Spring 2012 Student Performance Analysis

Grade 7 Mathematics Standards of Learning

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

VIRGINIA DEPARTMENT OF EDUCATION

Revised February 6, 2013

Negative Exponents and Comparing Numbers Represented in Different Formats

SOL 7.1

The student will

a) investigate and describe the concept of negative exponents for powers of ten;

b) determine scientific notation for numbers greater than zero;

c) compare and order fractions, decimals, percents, and numbers written in scientific notation;

d) determine square roots; and

e) identify and describe absolute value for rational numbers.

Suggested Practice for SOL 7.1A

Students need additional practice representing powers of ten that contain a negative exponent.

Which fraction and decimal are equivalent to 10^{-2} ?

a) $-\frac{1}{10^2}$ *and* -0.02

b) $\frac{1}{10^2}$ *and* 0.02

c) $-\frac{1}{10^2}$ *and* -0.01

d) $\frac{1}{10^2}$ *and* 0.01

Suggested Practice for SOL 7.1A

Which expression is equivalent to 10^{-5} ?

a) $10 \cdot 10 \cdot 10 \cdot 10 \cdot 10$

b) $\left(\frac{1}{10}\right) \cdot \left(\frac{1}{10}\right) \cdot \left(\frac{1}{10}\right) \cdot \left(\frac{1}{10}\right) \cdot \left(\frac{1}{10}\right)$

c) $-10 \cdot -10 \cdot -10 \cdot -10 \cdot -10$

d) $\left(-\frac{1}{10}\right) \cdot \left(-\frac{1}{10}\right) \cdot \left(-\frac{1}{10}\right) \cdot \left(-\frac{1}{10}\right) \cdot \left(-\frac{1}{10}\right)$

Suggested Practice for SOL 7.1C

Students need additional practice ordering numbers represented in different formats.

Arrange the four numbers shown in order from least to greatest.

6.7%	0.67	$\frac{6}{9}$	6.7×10^{-3}

6.7×10^{-3}	6.7%	$\frac{6}{9}$	0.67

Least to Greatest

Suggested Practice for SOL 7.1C

Students need additional practice comparing numbers represented in different formats.

Which number is greater than $1\frac{2}{3}$?

a) 1.34

b) 166 %

c) $\frac{7}{3}$

d) 1.6×10^0

Simplifying Integer Expressions

SOL 7.3

The student will

a) model addition, subtraction, multiplication, and division of integers; and

b) add, subtract, multiply, and divide integers.

Suggested Practice for SOL 7.3B

Students need additional practice evaluating expressions, particularly when expressions contain negative numbers.

a) **What is the value of this expression?**

$$(-17) - (-26) \div 2$$

$$-4$$

b) **Name two numbers that can be placed in the blank to make the value of this expression a negative number.**

$$(-21) - \underline{\quad ? \quad}$$

Any number greater than -21.

Solving Practical Problems Using Proportional Reasoning

SOL 7.4

The student will solve single-step and multistep practical problems, using proportional reasoning.

Suggested Practice for SOL 7.4

Students need additional practice determining the discounted price of a good or service.

a) **Xavier saved money to purchase a bike that originally cost $250, not including tax. The store discounted the bike by 20%. What is the discounted price he will pay for the bike, not including tax?** $200.00

b) **Kim and Steven went to dinner. Kim had a coupon for a 25% discount off the price of all meals, not including tax and tip. If the original price of the meals was $75.00, what is the discounted price, not including tax and tip?**

$56.25

Determining the Effect Changing One Dimension Has on Volume or Surface Area

SOL 7.5

The student will

a) describe volume and surface area of cylinders;

b) solve practical problems involving the volume and surface area of rectangular prisms and cylinders; and

c) describe how changing one measured attribute of a rectangular prism affects its volume and surface area.

Suggested Practice for SOL 7.5C

Students need additional practice determining what effect changing an attribute of a rectangular prism has on its volume and surface area.

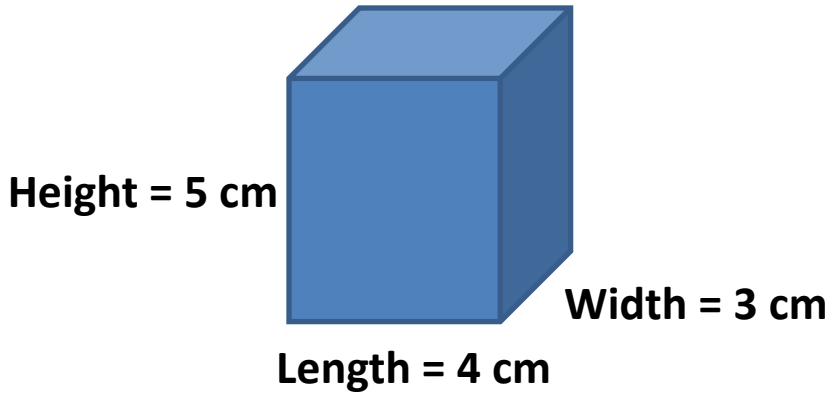
a) **What effect does doubling the width, length, OR height of a prism have on its volume?**

The volume of the new prism is double the volume of the original prism.

b) **A rectangular prism has a volume of $16\ \text{cm}^3$. If the height of the prism is tripled and the other dimensions stay the same, what is the volume of the new prism?** $48\ \text{cm}^3$

Suggested Practice for SOL 7.5C

The rectangular prism shown has a surface area of $94\ \text{cm}^2$.



If the height of the prism is increased to 15 cm and the other dimensions remain the same, the surface area –

a) Triples

b) Increases by $20\ \text{cm}^2$

c) Increases by $30\ \text{cm}^2$

d) Increases by $140\ \text{cm}^2$

Comparing and Contrasting Quadrilaterals

SOL 7.7

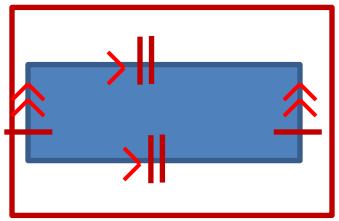
The student will compare and contrast the following quadrilaterals based on properties: parallelogram, rectangle, square, rhombus, and trapezoid.

Suggested Practice for SOL 7.7

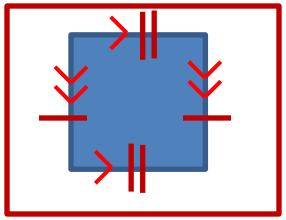
a) Identify the classifications to which this figure belongs.

Parallelogram	**Trapezoid**	**Quadrilateral**	Rhombus	Rectangle

b) Select each figure that appears to be a rectangle.



All angles in this figure are 90 degrees.



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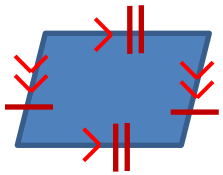
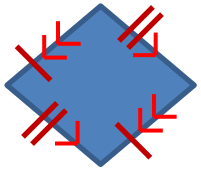
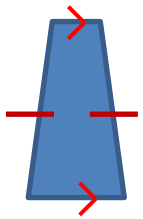






Graphing Transformations in the Coordinate Plane

SOL 7.8

The student, given a polygon in the coordinate plane, will represent transformations (reflections, dilations, rotations, and translations) by graphing in the coordinate plane.

Suggested Practice for SOL 7.8

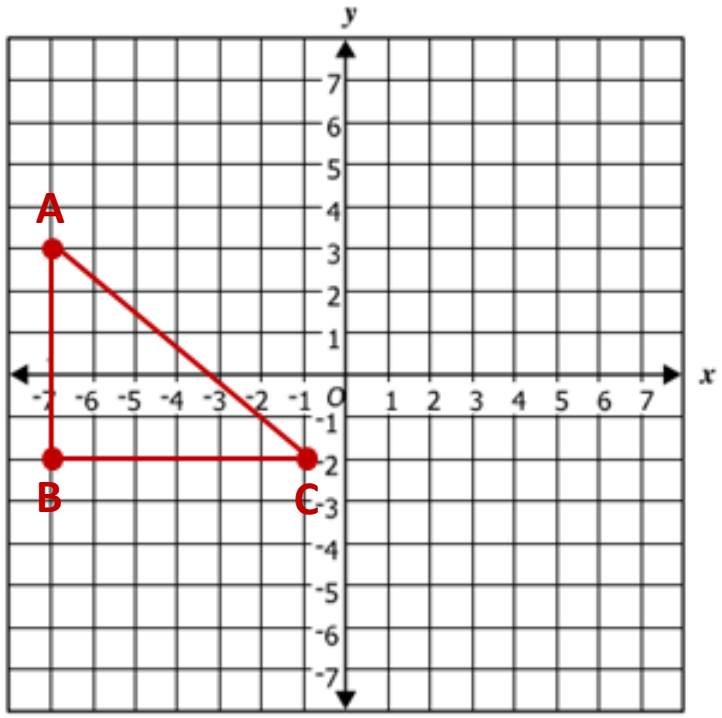
Students need additional practice applying transformations to a given figure on a coordinate plane.

a) **Identify the coordinates of the image of triangle ABC after a dilation about the origin by a factor of 2.**

b) **Identify the coordinates of the image of triangle ABC after a rotation of 180 degrees counterclockwise about the origin.**

c) **Identify the coordinates of the image of triangle ABC after a reflection over the y-axis.**

d) **Identify the coordinates of the image of triangle ABC after a translation 5 units to the right.**



A (-7,3) B (-7,-2) C (-1,-2)

Suggested Practice for SOL 7.8

Students need additional practice applying transformations to a given figure on a coordinate plane.

a) **Identify the coordinates of the image of triangle ABC that is dilated by a factor of 2.**

$A'(-14, 6)\ B'(-14, -4)\ C'(-2, -4)$

b) **Identify the coordinates of the image of triangle ABC that is rotated 180 degrees counterclockwise about the origin.**

$A'(7, -3)\ B'(7, 2)\ C'(1, 2)$

c) **Identify the coordinates of the image of triangle ABC that is reflected over the y-axis.**

$A'(7, 3)\ B'(7, -2)\ C'(1, -2)$

d) **Identify the coordinates of the image of triangle ABC that is translated 5 units to the right.**

$A'(-2, 3) B'(-2, -2)\ C'(4, -2)$

Determining the Probability of Compound Events

SOL 7.10

The student will determine the probability of compound events, using the Fundamental (Basic) Counting Principle.

Suggested Practice for SOL 7.10

Students need additional practice using the Fundamental Counting Principle to determine the number of possible outcomes.

The letters A, B, C, D, and E can be used to create a four letter code for a lock. Each letter can be repeated. What is the total number of four letter codes can be made using these letters?

625

Suggested Practice for SOL 7.10

Students need additional practice determining the probability of compound events.

A fair coin has faces labeled heads and tails. A fair cube has faces labeled A, B, C, D, E, and F. Adam will flip this coin and roll the cube one time each. What is the probability that the coin will land with tails face-up and the cube will land on the letter A?

$$\frac{1}{12}$$

Representing Relations in Different Forms

SOL 7.12

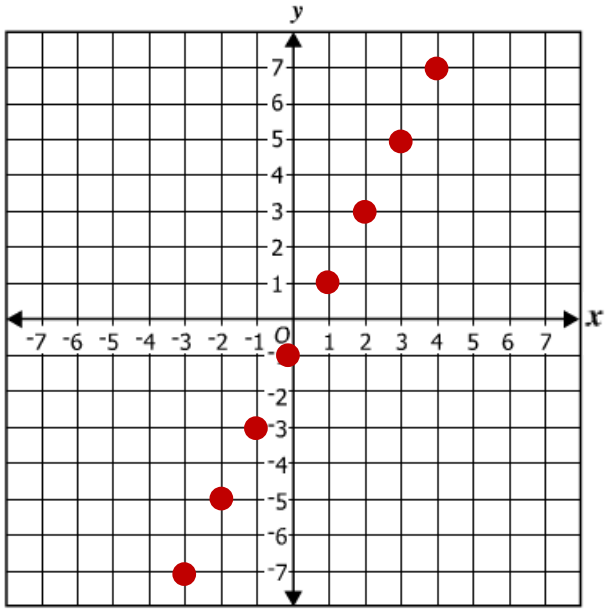
The student will represent relationships with tables, graphs, rules, and words.

Suggested Practice for SOL 7.12

Students need additional practice representing a relation on the coordinate plane when the relation is given as a rule.

Graph three points that are on the line represented by $y = 2x - 1$. The coordinates of the points must be integers.

Sample Answers



Solving and Graphing Inequalities

SOL 7.15

The student will

a) solve one-step inequalities in one variable; and

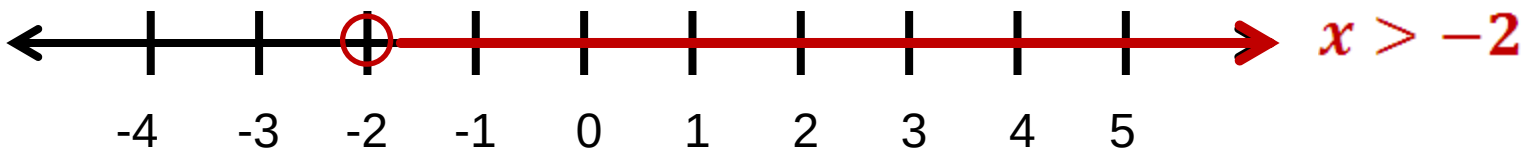
b) graph solutions to inequalities on the number line.

Suggested Practice for SOL 7.15

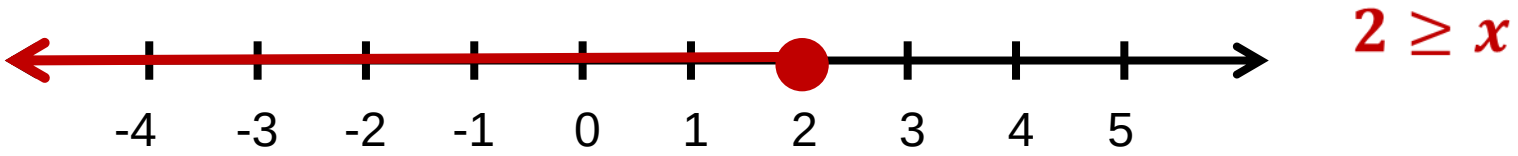
Students need additional practice differentiating between an open and closed circle, determining how multiplying or dividing by a negative number affects the inequality, and graphing inequalities that have the variable on the right side.

Solve the inequality and graph the solution on the number line.

a) $-5x < 10$



b) $10 \geq x + 8$



Identifying Properties

SOL 7.16

The student will apply the following properties of operations with real numbers:

a) **the commutative and associative properties for addition and multiplication;**

b) **the distributive property;**

c) **the additive and multiplicative identity properties;**

d) **the additive and multiplicative inverse properties; and**

e) **the multiplicative property of zero.**

Suggested Practice for SOL 7.16

Students need additional practice identifying properties of operations with real numbers.

Which property is illustrated by this number sentence?

$$(7 \cdot 3) + 4 = 4 + (7 \cdot 3)$$

a) Associative Property of Multiplication
b) Commutative Property of Multiplication
c) Commutative Property of Addition
d) Associative Property of Addition

Suggested Practice for SOL 7.16

Match the equation to its property.

$21 + 0 = 21$ — Identity Property of Addition

$63 + (-63) = 0$ — Inverse Property of Addition

$29 + (-4) = (-4) + 29$ — Commutative Property of Addition

$(18) + (-2 + 3) = (18 + -2) + (3)$ — Associative Property of Addition

Identity Property of Addition	**Commutative Property of Addition**
Additive Inverse Property	**Associative Property of Addition**

Practice Items

This concludes the student performance information for the spring 2012 Grade 7 Mathematics SOL test.

Additionally, test preparation practice items for Grade 7 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