

## Thinkwell's Placement Test 3 Answer Key

If you answered 7 or more Test 3 questions correctly, we recommend Thinkwell's Homeschool 8<sup>th</sup> Grade Math. If you answered fewer than 7 questions correctly, we recommend Thinkwell's Homeschool 7<sup>th</sup> Grade Math.

### 1. Answer: 27

#### Explanation

Follow the order of operations to simplify the expression. Begin by simplifying within the innermost grouping symbols,  $(4 + 2 \times 2)$ .

$$[(4 + 2 \times 2) - 5]^3$$

$$[(4 + 4) - 5]^3 \quad \text{Multiply.}$$

$$[8 - 5]^3 \quad \text{Add.}$$

$$[3]^3 \quad \text{Subtract.}$$

$$3 \times 3 \times 3 \quad \text{Expand the power.}$$

$$27 \quad \text{Multiply.}$$

This concept is covered in Thinkwell's 7<sup>th</sup> Grade Math topic "Order of Operations."

### 2. Answer: -0.01, 0.094, $\frac{1}{2}$

#### Explanation

Since -0.01 is the only negative number, -0.01 must be the smallest number. To compare 0.094 and  $\frac{1}{2}$ , write  $\frac{1}{2}$  as a decimal.

$$\frac{1}{2} = 0.5$$

The tenths-place digit in 0.094 is less than the tenths-place digit in 0.5, so 0.094 is less than 0.5. Therefore, the numbers listed from least to greatest are -0.01, 0.094,  $\frac{1}{2}$ .

This concept is covered in Thinkwell's 7<sup>th</sup> Grade Math topic "Comparing and Ordering Rational Numbers."

### 3. Answer: $s = 16$

#### Explanation

Since the variable  $s$  is divided by  $-8$ , begin by multiplying both sides by  $-8$ .

$$-2 = \frac{s}{-8}$$

$$-2(-8) = \frac{s}{-8}(-8) \quad \text{Multiply both sides by } -8.$$

$$16 = s \quad \text{Multiply.}$$

This concept is covered in Thinkwell's 7<sup>th</sup> Grade Math topic "Solving Equations Containing Integers."

4. Answer:  $y = 9\frac{1}{4}$

Explanation

$$\begin{array}{r} 31 = 4y - 6 \\ + 6 \quad \quad + 6 \\ \hline 37 = 4y \end{array} \quad \begin{array}{l} \text{Add 6 to each side.} \\ \text{Add 6 to 31.} \end{array}$$
$$\frac{37}{4} = \frac{4y}{4} \quad \text{Divide both sides by 4.}$$
$$y = \frac{37}{4} \text{ or } 9\frac{1}{4} \quad \text{Write the improper fraction as a mixed number.}$$

*This concept is covered in Thinkwell's 7<sup>th</sup> Grade Math topic "Solving Two-Step Equations."*

5. Answer:  $22\frac{3}{28}$  yards

Explanation

Add to find the total number of yards needed. Since the denominators of the fractions are 4 and 7, the common denominator will be 28 (the LCM of 4 and 7).

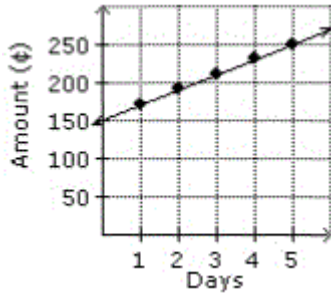
$$\begin{array}{r} 12\frac{1 \cdot 7}{4 \cdot 7} \rightarrow 12\frac{7}{28} \\ + 9\frac{6 \cdot 4}{7 \cdot 4} \rightarrow 9\frac{24}{28} \\ \hline 21\frac{31}{28} \end{array} \quad \begin{array}{l} \text{Write } \frac{1}{4} \text{ as an equivalent fraction with 28 as the denominator.} \\ \text{Write } \frac{6}{7} \text{ as an equivalent fraction with 28 as the denominator.} \\ \text{Add the whole numbers and add the fractions.} \end{array}$$

The fraction part of the mixed number is improper. So, write the improper fraction 31/28 as a mixed number, and then add the whole number part to 21.

$$21\frac{31}{28} = 21 + \frac{31}{28} = 21 + 1\frac{3}{28} = 22\frac{3}{28}$$

*This concept is covered in Thinkwell's 7<sup>th</sup> Grade Math topic "Adding and Subtracting Fractions and Mixed Numbers."*

6. Answer:  $y = 150 + 20x$



Explanation

The variable  $x$  is given to be the number of days. Let  $y$  represent the total amount in the piggy bank after  $x$  days. He starts with 150 cents in the bank and adds 20 cents each day. So, the total amount in the piggy bank at 0 days is 150, at 1 day the total is  $150 + 20(1)$ , at day 2 the total is  $150 + 20(2)$ , and at day 3 the total is  $150 + 20(3)$ . Since  $x$  represents the number of days and  $y$  represents the total, the equation is  $y = 150 + 20x$ . To graph this equation, draw the  $x$ - and  $y$ -axes showing only positive values (since the number of days and the total amount must always be positive). The scale used for  $x$  should be 1 since it represents the number of days, and the maximum number of days is given to be 5. The scale used for  $y$  must be some even interval that extends to at least 250, since the piggy bank will have  $150 + 20(5)$ , or 250 cents at day 5. Once the axes are drawn, plot the 5 ordered pairs (the solutions to the equation) for days 1, 2, 3, 4, and 5: (1, 170), (2, 190), (3, 210), (4, 230), and (5, 250). Last, draw a line through these points.

*This concept is covered in Thinkwell's 7<sup>th</sup> Grade Math topic "Graphing Linear Functions."*

7. Answer: **Quadrant IV**

Explanation

To graph the point (12, -10.2), move right to 12 on the  $x$ -axis and then move down 10.2 units. The point is located in the fourth quadrant.

*This concept is covered in Thinkwell's 7<sup>th</sup> Grade Math topic "The Coordinate Plane."*

8. Answer:  **$10x + 14y$**

Explanation

Perimeter is the distance around a figure. So, add the expression for the length of each side of the rectangle to write an expression for the perimeter.

$$(4x + 5y) + (x + 2y) + (4x + 5y) + (x + 2y) \quad \text{Add the lengths of the sides.}$$

$$4x + 5y + x + 2y + 4x + 5y + x + 2y \quad \text{Associative Property of Addition}$$

$$(4x + x + 4x + x) + (5y + 2y + 5y + 2y) \quad \text{Group the like terms.}$$

$$10x + 14y \quad \text{Combine the like terms by adding their coefficients.}$$

*This concept is covered in Thinkwell's 7<sup>th</sup> Grade Math topic "Simplifying Algebraic Expressions."*

**9. Answer:  $P = 41.7$  cm,  $A = 78.69$  cm<sup>2</sup>**

Explanation

The perimeter is the distance around the outside of the figure. So, find the sum of the lengths of the sides, not including the part of the sides where the semi-circles are, and the circumference of each semi-circle. The circumference of the small semi-circle is  $C = \frac{1}{2}\pi(2)$ , since the diameter is 2 and the formula for the circumference of a circle is  $C = \pi d$ ; or  $C \approx \frac{1}{2}(3.14)(2) = 3.14$ . The large semi-circle's circumference is  $C = \frac{1}{2}\pi(8)$ , since the diameter is 8, or  $C \approx \frac{1}{2}(3.14)(8) = 12.56$ . Add those two lengths to the lengths of the sides.

$$P = 3.14 + 12.56 + 11 + 5 + 5 + 5 = 41.7 \text{ cm}$$

The area is the measure of the space inside the figure. Divide the figure into two semi-circles and a parallelogram and then find the area of each.

Semi-circle with radius 1:  $A = \frac{1}{2}\pi(1^2) \approx \frac{1}{2}(3.14)(1) = 1.57$  cm<sup>2</sup>

Semi-circle with radius 4:  $A = \frac{1}{2}\pi(4^2) \approx \frac{1}{2}(3.14)(16) = 25.12$  cm<sup>2</sup>

Parallelogram with base 13 and height 4:  $A = 13(4) = 52$  cm<sup>2</sup>

$$\text{Area of figure: } A = 1.57 + 25.12 + 52 = 78.69 \text{ cm}^2$$

*This concept is covered in Thinkwell's 7<sup>th</sup> Grade Math topic "Area of Irregular Figures."*

**10. Answer:  $y = 235$  cm**

Explanation

The two triangles are similar, so ratios of the corresponding sides are proportional. The corresponding side to the side with length  $y$  has length 94 cm. Therefore, one ratio can be  $y/94$ . The only other given side in the triangle with side  $y$  has length 180 cm. The corresponding side to the side with length 180 has length 72 cm. Therefore, a second ratio is  $180/72$ . Set these two ratios equal to each other to form a proportion, and then solve the proportion for  $y$ .

$$\frac{y}{94} = \frac{180}{72} \quad \text{Write the proportion of ratios of corresponding sides.}$$
$$72y = 94(180) \quad \text{Cross multiply.}$$
$$72y = 16920 \quad \text{Multiply.}$$
$$y = 235 \quad \text{Divide each side by 72.}$$

*This concept is covered in Thinkwell's 7<sup>th</sup> Grade Math topic "Using Similar Figures."*

### Guidelines for Interpreting Placement Test Scores

Placement Test	Number of Correct Answers	Recommendation
Placement Test 1	5 or more	<a href="#">Thinkwell's 6<sup>th</sup> Grade Math</a>
Placement Test 2	6 or less	<a href="#">Thinkwell's 6<sup>th</sup> Grade Math</a>
	7 or more	<a href="#">Thinkwell's 7<sup>th</sup> Grade Math</a>
Placement Test 3	4 or less	<i>complete Placement Test 2</i>
	5 or 6	<a href="#">Thinkwell's 7<sup>th</sup> Grade Math</a>
	7 or more	<a href="#">Thinkwell's 8<sup>th</sup> Grade Math</a>
Placement Test 4	4 or less	<i>complete Placement Test 3</i>
	5 or 6	<a href="#">Thinkwell's 8<sup>th</sup> Grade Math</a>
	7 or more	<a href="#">Thinkwell's Intermediate Algebra (Algebra 1)</a>
Placement Test 5	4 or less	<i>complete Placement Test 4</i>
	5 or 6	<a href="#">Thinkwell's Intermediate Algebra (Algebra 1)</a>
	7 or more	<a href="#">Thinkwell's College Algebra (Algebra 2)</a>
Placement Test 6	4 or less	<i>complete Placement Test 5</i>
	5 or 6	<a href="#">Thinkwell's College Algebra (Algebra 2)</a>
	7 or more	<a href="#">Thinkwell's Precalculus</a>
Placement Test 7	4 or less	<i>complete Placement Test 6</i>
	5 or 6	<a href="#">Thinkwell's Precalculus</a>
	7 or more	<a href="#">Thinkwell's Calculus</a>