

## Thinkwell's Placement Test 4 Answer Key

If you answered 7 or more Test 4 questions correctly, we recommend Thinkwell's Homeschool Algebra 1. If you answered fewer than 7 questions correctly, we recommend Thinkwell's Homeschool 8<sup>th</sup> Grade Math.

### 1. Answer: -17

#### Explanation

Substitute the values of the variables into the expression and then use the order of operations to simplify.

$$a^x - (b \cdot c) \div d$$

$$2^3 - (10 \cdot 5) \div 2 \quad \text{Substitute.}$$

$$2^3 - 50 \div 2 \quad \text{Simplify within parentheses.}$$

$$2 \cdot 2 \cdot 2 - 50 \div 2 \quad \text{Expand the power.}$$

$$8 - 50 \div 2 \quad \text{Multiply.}$$

$$8 - 25 \quad \text{Divide.}$$

$$-17 \quad \text{Subtract.}$$

This concept is covered in Thinkwell's 8<sup>th</sup> Grade Math topic "Using the Order of Operations."

### 2. Answer: $n = 49$

#### Explanation

$$10 = \frac{y - 9}{4}$$

$$4(10) = \frac{y - 9}{4}(4) \quad \text{Multiply both sides by 4.}$$

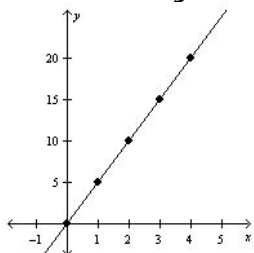
$$40 = y - 9 \quad \text{Multiply.}$$

$$\begin{array}{r} +9 \\ 40 = y - 9 \\ \hline \end{array} \quad \begin{array}{r} +9 \\ \hline \end{array} \quad \text{Add 9 to each side.}$$

$$49 = y \quad \text{Add 9 to 40.}$$

This concept is covered in Thinkwell's 8th Grade Math topic "Solving Two-Step Equations."

### 3. Answer: $y = 5x$



#### Explanation

The table shows  $x$ -values increasing by 1 and  $y$ -values increasing by 5. So, the values in the table follow the pattern "multiply the  $x$ -value by 5 to get the  $y$ -value." Write this as an equation:  $y = 5x$ . To make the graph, plot the ordered pairs from the table on a coordinate plane. The ordered pairs are  $(0, 0)$ ,  $(1, 5)$ ,  $(2, 10)$ ,  $(3, 15)$ , and  $(4, 20)$ . Then, draw a line through the points.

This concept is covered in Thinkwell's 8th Grade Math topic "Equations, Tables, and Graphs."

**4. Answer:  $8\sqrt{2}$**

Explanation

$$\sqrt{8} + \sqrt{72}$$

$$\sqrt{4 \cdot 2} + \sqrt{36 \cdot 2} \quad \text{Write each radicand as a product of a perfect square and a number.}$$

$$\sqrt{4} \cdot \sqrt{2} + \sqrt{36} \cdot \sqrt{2} \quad \text{Product of Square Roots Property}$$

$$2\sqrt{2} + 6\sqrt{2} \quad \text{Simplify the square roots of perfect squares.}$$

$$8\sqrt{2} \quad \text{Combine the like terms by adding the coefficients.}$$

*This concept is covered in Thinkwell's 8th Grade Math topic "Operations with Square Roots."*

**5. Answer: 30 ft**

Explanation

Use the scale to write a proportion and solve. Let  $x$  be the length of the actual airplane.

$$\frac{1 \text{ in.}}{4 \text{ ft}} = \frac{7.5 \text{ in.}}{x \text{ ft}} \quad \text{Write the proportion.}$$

$$1x = 4(7.5) \quad \text{Cross multiply.}$$

$$x = 30 \quad \text{Multiply.}$$

*This concept is covered in Thinkwell's 8th Grade Math topic "Scale Drawings and Scale Models."*

**6. Answer: yes; slope =  $-3$ ; y-intercept = 5**

Explanation

The given function,  $f(x) = -3x + 5$ , is equivalent to  $y = -3x + 5$ , since  $f(x) = y$ . The function is linear since it can be written in slope-intercept form,  $y = mx + b$ , where  $m$  is the slope and  $b$  is the y-intercept. Therefore, the slope is  $-3$  and the y-intercept is 5.

*This concept is covered in Thinkwell's 8th Grade Math topic "Linear Functions."*

**7. Answer: 5,446,562.6 ft<sup>3</sup>**

Explanation

Use the formula for the volume of a cone.

$$V = \frac{1}{3} \pi r^2 h$$

$$\approx \frac{1}{3} (3.14)(48)^2 (64) \quad \text{Substitute 3.14 for } \pi, 48 \text{ for } r \text{ and 64 for } h.$$

$$\approx \frac{1}{3} (3.14)(2304)(64) \quad \text{Evaluate the power.}$$

$$\approx 154337.28 \quad \text{Simplify.}$$

Multiply the volume (which is in cubic meters) by the cube of the conversion factor to convert the volume to cubic feet.

$$154337.28 \text{ m}^3 \left( \frac{3.2808 \text{ ft}}{1 \text{ m}} \right)^3 = 5450170.77... \approx 5,450,170.8$$

*This concept is covered in Thinkwell's 8th Grade Math topic "Converting Units of Measurement."*

**8. Answer: 26.87%**

Explanation

Subtract 49 from 67 and then divide that difference by the original number, 67.

$$67 - 49 = 18$$

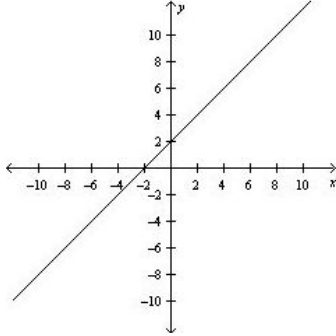
$$18/67 = 0.26865... \approx 0.2687$$

Write the number as a percent.

$$0.2687 = 26.87\%$$

*This concept is covered in Thinkwell's 8th Grade Math topic "Percent Increase and Decrease."*

**9. Answer: x-intercept: -2, y-intercept: 2**



Explanation

Substitute 0 into the equation for y to find the x-intercept (since the x-intercept is the point on the line where  $y = 0$ ).

$$-x + y = 2$$

$$-x + 0 = 2 \quad \text{Substitute.}$$

$$-x = 2 \quad \text{Simplify.}$$

$$x = -2 \quad \text{Divide each side by -1.}$$

Therefore, the x-intercept is  $(-2, 0)$ .

Substitute 0 into the equation for x to find the y-intercept (since the y-intercept is the point on the line where  $x = 0$ ).

$$-x + y = 2$$

$$-0 + y = 2 \quad \text{Substitute.}$$

$$y = 2 \quad \text{Simplify.}$$

Therefore, the y-intercept is  $(0, 2)$ .

To graph the equation, plot the intercepts on a coordinate plane and then draw a line through the points.

*This concept is covered in Thinkwell's 8th Grade Math topic "Using Slopes and Intercepts."*

**10. Answer:  $12a^3b + 240a^2b^2 - 48ab$**

Explanation

First, notice that the terms within parentheses are not like terms. Therefore, the expression within parentheses cannot be simplified (since the operations are addition and subtraction). So, use the distributive property to remove the parentheses and thus simplify the expression.

$$12ab(a^2 + 20ab - 4)$$

$$12ab(a^2) + 12ab(20ab) - 12ab(4) \quad \text{Distribute } 12ab \text{ to each term within parentheses.}$$

$$12a^3b + 240a^2b^2 - 48ab \quad \text{Multiply.}$$

*This concept is covered in Thinkwell's 8th Grade Math topic "Multiplying Polynomials by Monomials."*

### 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>