Warm-Up | Writing and Solving Equations in Two Variables

Lesson Question

Lesson Goals

Determine possible values for _____ quantities in real-world situations.

Write equations with two _____ to represent situations.

Solve for an unknown value after _____ a known value.

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

	a mathematical statement that uses an equals sign to equate two algebraic expressions
	a letter or symbol used to represent an unknown quantity
	to take the place of; to replace
	the rules that allow the balancing, manipulating, and solving of equations (e.g., the addition property of equality states "if $x = y$, then $x + z = y + z$")

Warm-Up | Writing and Solving Equations in Two Variables

Solving a Two-Step Equation

Properties of equality

Adding, subtracting, multiplying, or dividing by the same value on both sides of an equation does not ☐ the solution set.

$$\frac{x}{6} - 4.2 = 3$$

$$+ 4.2 \quad + 4.2$$

$$\square\left(\frac{x}{6}\right) = 7.2(\square)$$

$$x = \square$$

Check: $\frac{\square}{6} - 4.2 = 3$

$$7.2 - 4.2 = 3$$

$$\square = 3$$

Instruction | Writing and Solving Equations in Two Variables

Slide 2

Two-Variable Equations as Models

Example: Miranda has 55 feet of fencing. She wants to use all the fencing to create a rectangular garden. The equation $2l + 2w = 55$, where l is the length of the garden and w is the width, models the scenario. This equation can be used to find one dimension of the garden if the other dimension is known.

Think about constraints:

Each side must be _____ than 0.

Each side must be _____ then 27.5.

Each side must be greater than a _____ inches.

Using an Equation with Two Variables to Solve a Problem

Miranda has 55 feet of fencing. She wants to use all the fencing to create a rectangular garden. The equation $2l + 2w = 55$, where l is the length of the garden and w is the width, models the scenario. This equation can be used to find one dimension of the garden if the other dimension is known.

If Miranda makes the garden 17.5 feet long, how wide should she make it?

1. _____ 17.5 for l.
2. Simplify.
3. Use the properties of equality to solve for w.

$$2(\square) + 2w = 55$$
$$35 + 2w = 55$$
$$-35 \qquad -35$$
$$0 + \frac{2w}{2} = \frac{20}{2}$$
$$w = \square \text{ ft}$$

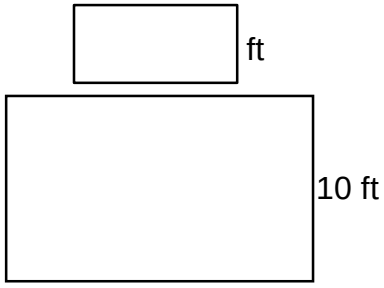
Slide 2

4. Check.

$$2(17.5) + 2(\square) = 55$$

$$35 + 20 = 55$$

$$\square = 55$$



6

Writing a Two-Variable Equation to Model a Scenario

Tickets at a movie theater cost $9 for adults and $6.75 for children. Ticket sales for one movie showing totaled $1406.25.

What equation models the situation?

Adult ticket sales $+$ $\square$ ticket sales $=$ total sales

$$9a + \square = 1406.25$$

What do the $\square$ represent?

$\square$ = number of adult tickets

c = number of child tickets

Slide 6

Using an Equation to Solve a Problem

Tickets at a movie theater cost $9 for adults and $6.75 for children. Ticket sales for one movie showing totaled $1406.25. The equation $9a + 6.75c = 1406.25$ models the situation, where *a* represents the number of adult tickets sold and c represents the number of child tickets sold.

If 75 child tickets were sold, how many adult tickets were sold?

$$9a + 6.75(\square) = 1406.25$$

$$9a + 506.25 = 1406.25$$

$$-506.25 \quad -506.25$$

$$\frac{9a}{9} = \frac{\square}{9}$$

$$a = \square \text{ adult ticket}$$

The answer checks, because $9(100) + 6.75(75) = 1406.25$.

Slide 9

Tables and Two-Variable Equations

Carlos is buying drinks to bring to a study group. The table shows some combinations of the drinks he might buy. If Carlos buys 7 bottles of water, how many bottles of lemonade will he buy?

Number of bottles of water, x		Number of bottles Of lemonade, y	
1	+	12	= 13
2	+	11	= 13
3	+	10	= 13
4	+	9	= 13

$x + y =$ ☐

☐ $+ y = 13$

-7 $\quad -7$

$y =$ ☐ bottles of lemonade

Summary | Writing and Solving Equations in Two Variables

Lesson Question	What kind of word problem can be solved with a two-variable equation?

Answer

Use this space to write any questions or thoughts about this lesson.