2-3 Solving Multi-Step Equations

Vocabulary

Review

1. Circle the *variable* or *variables* in each equation below.

$x - 11 = 35$ $\quad -2y + 6 + y = 6$ $\quad 2t + 14 = t$ $\quad 19 = 3 + 4b$

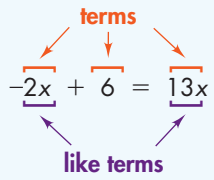
2. Find the *solution* of $19 = 3 + 4b$.

Vocabulary Builder

term (noun) **turm**

Definition: **A term** is a number, a variable, or the product of a number and one or more variables. *Like terms* have exactly the same variable factors.

Main Idea: Combining *like terms* helps you solve equations.



Use Your Vocabulary

3. Write the number of *terms* in each equation.

$14 = x + 6$ ____ $\quad 2z + z - 5 = 10$ ____ $\quad 9 = 6 + 2m - 7m$ ____

4. Look at the variables in each expression below. Write **Y** if the terms of each expression are *like terms*. Write **N** if they are NOT *like terms*.

$5x + (-2x)$ ____ $\quad 6w - 6z$ ____ $\quad \frac{m}{2} + \frac{m}{3}$ ____

Write T for *true* or F for *false*.

____ **5.** Expressions with only numbers are always *like terms*.

____ **6.** The expressions xy and yx are *like terms*.

Problem 1 Combining Like Terms

Got It? **What is the solution of $11m - 8 - 6m = 22$?**

7. Circle the like terms in the expression. $11m - 8 - 6m$

8. Underline the correct word to complete the sentence.

I can rewrite the equation as $11m - 6m - 8 = 22$ using the Associative / Commutative Property of Addition.

9. Now solve the equation.

Problem 2 Solving a Multi-Step Equation

Got It? **Noah and Kate are shopping for new guitar strings in a music store. Noah buys 2 packs of strings. Kate buys 2 packs of strings and a music book. The book costs $16. Their total cost is $72. How much is one pack of strings?**

10. Complete the model to write the equation.

Relate amount Noah spent on strings | plus | amount Kate spent on strings and a music book | is | total amount spent by Noah and Kate

Define Let $c =$ _____.

Write $2 \cdot$ ☐ $+$ $2 \cdot$ ☐ $+$ ☐ $=$ ☐

11. Combine like terms to solve the equation.

12. The cost of one pack of strings is $ ☐.

Problem 3 Solving an Equation Using the Distributive Property

Got It? **What is the solution of $18 = 3(2x - 6)$? Check your answer.**

13. Use the justifications at the right to solve the equation.

$18 = 3(2x - 6)$	Write the original equation.
$18 = \square \cdot (2x) - \square \cdot (6)$	Use the Distributive Property.
$18 = \square \cdot (x) - 18$	Multiply.
$18 + \square = \square - 18 + \square$	Use the Addition Property of Equality.
$\square = 6x$	Add.
$\frac{\square}{6} = \frac{6x}{\square}$	Use the Division Property of Equality.
$\square = x$	Simplify.

14. Check your answer. $18 = 3(2x - 6)$

$18 \stackrel{?}{=} 3(2 \cdot \square - 6)$

$18 \stackrel{?}{=} 3 \cdot (\square)$

Problem 4 Solving an Equation That Contains Fractions

Got It? **What is the solution of $\frac{2b}{5} + \frac{3b}{4} = 3$? Why did you choose the method you used?**

15. Circle the first step you could use to solve the equation. Then underline the second step you could use.

Combine like terms. Divide each side by 5. Multiply each side by 4. Multiply each side by 20.

16. Suppose you began by writing the fractions with a common denominator. What would your second step be?

17. Now use one of the methods from Exercise 15 or Exercise 16 to solve the equation.

Problem 5 Solving an Equation That Contains Decimals

Got It? **What is the solution of $0.5x - 2.325 = 3.95$? Check your answer.**

18. Because the equation contains thousandths, multiply each side by 10 , or .

19. Rewrite the equation without decimals.

$\square - 2325 = \square$

20. Now solve the equation.

21. Check your answer.

Does $0.5 \cdot \square - 2.325 = 3.95$? Yes / No

Lesson Check • Do you UNDERSTAND?

Reasoning **Ben solves the equation $-24 = 5(g + 3)$ by first dividing each side by 5. Amelia solves the equation by using the Distributive Property. Whose method do you prefer? Explain.**

22. Complete Ben's solution and Amelia's solution.

Ben's Solution

$$-24 = 5(g + 3)$$

$$\frac{-24}{5} = \frac{5(g + 3)}{5}$$

$$\frac{-24}{5} - \square = g + 3 - \square$$

$$\square = g$$

Amelia's Solution

$$-24 = 5(g + 3)$$

$$-24 = 5g + 15$$

$$\frac{-39}{\square} = \frac{5g}{\square}$$

$$\square = g$$

23. Whose method do you prefer? Explain.

Math Success

Check off the vocabulary words that you understand.

☐ one-step equation ☐ multi-step equation

Rate how well you can *solve a multi-step equation.*

Need to review 0 2 4 6 8 10 Now I get it!