Solving Multi-Step Equations

Warm Up

Solve.

1. $-8p - 8 = 56$ $p = -8$

2. $13d - 5 = 60$ $d = 5$

3. $9x + 24 = 60$ $x = 4$

4. $\frac{k}{7} + 4 = 11$ $k = 49$

5. $19 + \frac{z}{4} = 24$ $z = 20$

Solving Multi-Step Equations

Essential Question:

How can you solve equations that contain multiple operations?

Standard:

MCC7.EE.4:

Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations to solve problems by reasoning about the quantities.

Solving Multi-Step Equations

Record steps into foldable for multi-step equations

1. See if you need to Distribute.
2. Combine Like Terms
3. Use inverse operations to “undo” any addition or subtraction.
4. Do the same to the other side.
5. Use inverse operations to “undo” any multiplication or division.
6. Do the same to the other side

Write in foldable

*Always get rid of subtraction by crossing the line and changing the sign.

*Place any needed understood 1s.

Solving Multi-Step Equations

Additional Example 1: Combining Like Terms to Solve Equations

Solve $12 - 7b + 10b = 18$.

$12 - 7b + 10b = 18$

$12 + 3b = 18$ *Combine like terms.*

$-12 \qquad -12$ *Subtract 12 from both sides.*

$3b = 6$

$\frac{3b}{3} = \frac{6}{3}$ *Divide both sides by 3.*

$b = 2$

Solving Multi-Step Equations

Check It Out: Example 1

Solve $14 - 8b + 12b = 62$.

$14 - 8b + 12b = 62$

$14 + 4b = 62$ *Combine like terms.*

$-14 \qquad -14$ *Subtract 14 from both sides.*

$4b = 48$

$\frac{4b}{4} = \frac{48}{4}$ *Divide both sides by 4.*

$b = 12$

Complete combining like terms problems. WB Pg. 139

Solve each equation.

1. $4x - 2x + 3 = 7$

2. $8 = 3n + 2n - 7$

3. $5(c + 4) = 25$

4. $\frac{1}{3}(t + 6) = 27$

5. $0.3(b - 21) = 3.6$

6. $30 = 12 + 6a - 3a$

7. $s + s + \frac{1}{6} = \frac{2}{3}$

8. $4.2v + 1.8v = 54$

Solving Multi-Step Equations

You may need to use the Distributive Property to solve an equation that has parentheses. Multiply each term inside the parentheses by the factor that is outside the parentheses. Then combine like terms.

Solving Multi-Step Equations

Remember!

The Distributive Property states that $a(b + c) = ab + ac$.

For instance, $2(3 + 5) = 2(3) + 2(5)$.

Solving Multi-Step Equations

Additional Example 2: Using the Distributive Property to Solve Equations

Solve $5(y - 2) + 6 = 21$

$5(y - 2) + 6 = 21$

$5(y) - 5(2) + 6 = 21$ *Distribute 5 on the left side.*

$5y - 4 = 21$ *Simplify and combine like terms.*

$+4 \quad +4$ *Add 4 to both sides.*

$\frac{5y}{5} = \frac{25}{5}$ *Divide both sides by 5.*

$y = 5$

Solving Multi-Step Equations

Check It Out: Example 2

Solve $3(x - 3) + 4 = 28$

$3(x - 3) + 4 = 28$

$3(x) - 3(3) + 4 = 28$ *Distribute 3 on the left side.*

$3x - 5 = 28$ *Simplify and combine like terms.*

$+ 5 \quad + 5$ *Add 5 to both sides.*

$\frac{3x}{3} = \frac{33}{3}$ *Divide both sides by 3.*

$x = 11$

Complete the distributive property problems. WB Pg. 136

Solve each equation.

1. $4x - 2x + 3 = 7$

2. $8 = 3n + 2n - 7$

3. $5(c + 4) = 25$

4. $\frac{1}{3}(t + 6) = 27$

5. $0.3(b - 21) = 3.6$

6. $30 = 12 + 6a - 3a$

7. $s + s + \frac{1}{6} = \frac{2}{3}$

8. $4.2v + 1.8v = 54$

Solving Multi-Step Equations

Multi-Step Dance

Solving Multi-Step Equations

Additional Example 3: Problem Solving Application

Troy owns three times as many trading cards as Hillary. Subtracting 9 from the number of trading cards Troy owns and then dividing by 6 gives the number of cards owns. If Sean owns 24 trading cards, how many trading cards does Hillary own?

Solving Multi-Step Equations

Check It Out: Example 3

John is twice as old as Helen. Subtracting 4 from John's age and then dividing by 2 gives William's age. If William is 24, how old is Helen?

Complete 9 and 10. WB Pg. 126

9. Ms. Pryce has 82 books. She puts 10 of them in her desk. The rest will go in her bookcases. One bookcase has 2 shelves, and the other has 4 shelves. Write and solve an equation to find s, the number of books Ms. Pryce should put on each shelf so that each has the same number of books.

10. Tubes of oil paint are on sale for \$0.50 off. Cody bought 6 tubes of paint on sale and paid a total of \$25.80. Write and solve an equation to find r, the regular price in dollars of each tube of oil paint.

Solving Multi-Step Equations

Homework

Workbook Pg. 137

Choose 8 but must have both combining like terms and distributive property. Must choose 16.