

## Warm-up 9-13

Solve the following equations.

1.  $3t = 24$

2.  $-5p = -125$

3.  $m + 9 = 87$

4.  $4x = 96$

5.  $\frac{m}{-4} = 47$

## Warm-up 9-13

Solve the following equations.

1.  $\frac{3t}{3} = 24$

$t = 8$

3.  $m + 9 = 87$

$m = 78$

5.  $\frac{m}{4} = 47$

$m = -188$

2.  $\frac{-5p}{-5} = -125$

$p = 25$

4.  $\frac{4x}{4} = 96$

$x = 24$

# Today's Goals

- Solve 1 step equations
  - > using addition, subtraction, multiplication, and division
- Solve 2 and multi-step equations
  - > using addition, subtraction, multiplication, and division

## Evaluation

Evaluate: find the equivalent value (solve)

- substitute or simplify an expression
- end up with a number

Evaluate the expressions below for

$$a = 6, m = 2, \text{ and } r = 5$$

1.  $a - r$

$$6 - 5 = 1$$

2.  $mr$

$$2(5) = 10$$

3.  $2r - am$

$$2(5) - (6)(2) = -2$$

SAD3MD

**Solving Equations** ~ to find the values of the variable in the equation, which makes the equation true. The set of values is called a solution set.

ALL SOLUTIONS WILL BE REAL NUMBERS!!!!

**The goal is to isolate the variable (get it by itself)**

In order to solve equations we have to use specific properties.

## Equality Properties

### Addition Property

If  $a = b$ , then  $a + c = b + c$

$$6 + 4 = 4 + 6$$

$$10 = 10$$

### Subtraction Property

If  $a = b$ , then  $a - c = b - c$

$$-7 + 25 = 25 - 7$$

$$18 = 18$$

### Multiplication Property

If  $a = b$ , then  $ac = bc$

$$(3)21 = 21(3)$$

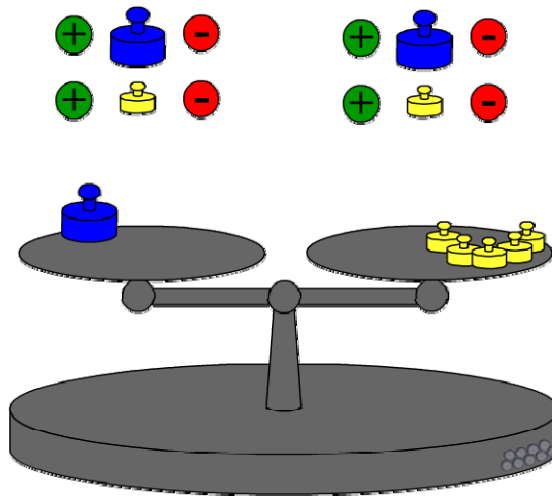
$$63 = 63$$

### Division Property

If  $a = b$ , then  $\frac{a}{c} = \frac{b}{c}$

$$\frac{14}{2} = \frac{14}{2}$$

$$7 = 7$$



## Solving Equations

Equations are solved by doing the order of operations in **reverse** after simplifying.

1. Add or subtract
2. Multiply or divide

To move a number to the other side of the equal sign, you perform the opposite operation.

Examples:

$$1. \quad \begin{array}{r} x - 5 = 22 \\ +5 \quad +5 \\ \hline x = 27 \end{array}$$

$$2. \quad \begin{array}{r} 4x = 24 \\ \frac{4}{4} \quad \frac{4}{4} \\ \hline x = 6 \end{array}$$

$$3. \quad \begin{array}{r} x + 9 = 21 \\ -9 \quad -9 \\ \hline x = 12 \end{array}$$

$$4. \quad \begin{array}{r} m = 40(10) \\ \frac{m}{10} \\ \hline m = 400 \end{array}$$

$$5. \quad \begin{array}{r} k - 11 + 2 = 28 \\ +11 \quad +11 \\ \hline k + 2 = 39 \\ -2 \quad -2 \\ \hline k = 37 \end{array}$$

$$6. \quad \begin{array}{r} p - 5 = -31 \\ +5 \quad +5 \\ \hline p = -16 \end{array}$$

$$\begin{array}{r} k - 11 + 2 = 28 \\ k - 9 = 28 \\ +9 \quad +9 \\ \hline k = 37 \end{array}$$

$$k = 37$$

## More Examples

1.  $-4x = 10$

2.  $-x = 25$

3.  $x + \frac{13}{2} = \frac{26}{4}$

4.  $-6 + x = 36$

5.  $\frac{x}{3} = -51$



Solve each equation.

1.  $r - 4 = -8$

2.  $\frac{5}{12} = s - \frac{11}{12}$

3.  $m + 13 = 58$

4.  $8y = 4$

5.  $126 = -9q$

6.  $\frac{2}{5}m = 16$

Lesson Quiz 2.2b

# Today's Goals

I can Solve Two and Multi-Step Equations

Section 2.3 ~ Multi-Step Equations

PEMDAS

Operations Happening  
in the Problem

Multiplication  
Addition

$$3m + 15 = 21$$

$$\begin{array}{r} -15 \quad -15 \\ \hline 3m = 6 \\ \frac{3m}{3} = \frac{6}{3} \end{array}$$

$$m = 2$$

$$3(2) + 15$$

$$6 + 15$$

$$21 = 21 \checkmark$$

To Solve the Equation

2 Division  
1 Subtraction

Examples:

$$1. \quad -4 + 7x = 3$$

$$\begin{array}{r} +4 \quad +4 \\ \hline \end{array}$$

$$7x = 7$$

$$\frac{7x}{7} = \frac{7}{7}$$

$$x = 1$$

$$2. \quad \frac{n}{7} + 2 = 2$$

$$\begin{array}{r} -2 \quad -2 \\ \hline \end{array}$$

$$\frac{n}{7} = 0$$

$$n = 0$$

$$3(2)18 = \frac{(4a + 10)}{2} \cdot 2$$

$$36 = 4a + 10$$

$$\begin{array}{r} -10 \quad -10 \\ \hline \end{array}$$

$$\frac{26}{4} = \frac{4a}{4}$$

$$a = \frac{13}{2}$$

$$18 = \frac{4a + 10}{2}$$

$$\frac{18}{2} = \frac{4a + 10}{2}$$

$$\begin{array}{r} -5 \quad -5 \\ \hline \end{array}$$

$$\frac{13}{2} = \frac{4a}{2}$$

$$a = \frac{13}{2}$$

Try These!!!!

4.  $5t - 2 = -32$

$$\begin{array}{r} +2 \quad +2 \\ \hline 5t = -30 \\ \frac{5t}{5} = \frac{-30}{5} \\ t = -6 \end{array}$$

5.  $-3m + 24 = 57$

$$\begin{array}{r} -24 \quad -24 \\ \hline -3m = 33 \\ \frac{-3m}{-3} = \frac{33}{-3} \\ m = -11 \end{array}$$

Multi-Step Equations

$$6x + 3 - 8x = 13$$

$$\begin{array}{r} -2x + 3 = 13 \\ \underline{-3 \quad -3} \end{array}$$

$$\begin{array}{r} -2x = 10 \\ \underline{-2 \quad -2} \end{array}$$

$$x = -5$$

$$8xyz + 3xyz - 3xy$$

Simplify

1. Remove any parentheses
2. Identify any like terms (numbers or like variables)
3. Combine like terms
4. Perform reverse order of operations to solve equation

## Multi-Step Examples

$$1. \quad 4(x - 2) + 2x = 40$$
$$\quad 4x - 8 + 2x = 40$$
$$\quad 6x - 8 = 40$$

$$2. \quad 3d - 1(9 - 2d) = 51$$
$$\quad 3d - 9 + 2d = 51$$
$$\quad 5d - 9 = 51$$

$$3. \quad 2a + 3(-8a) = 8$$
$$\quad -6a + 3 = 8$$

$$4. \quad 5y - 11 - 3y - 15 = 44$$
$$\quad 2y - 26 = 44$$

$$-3x + 8 - 9x = -18$$

# Homework

pg. 36-37 #1, 4, 7, 10, 13, 16, 62, 63