

Name: KEY Hour: _____ Date: _____

NOTES: Sections 3.3 – Solving Two Step Equations

Goals: #1 – I can solve multi-step equations using addition, subtraction, multiplication, and division.



Homework: Two-Step Equation Maze

Warm Up:

1. Solve the following equations.

a. $\frac{-0.5x}{-0.5} = \frac{6}{-0.5}$

$x = -12$

b. $-\frac{1}{3}h = \frac{2}{5}$

$(-\frac{3}{1}) \cdot -\frac{1}{3}h = \frac{2}{5}(-\frac{3}{1})$

$h = \frac{-6}{5}$

c. $y + \frac{2}{3} = -\frac{1}{6}$
 $-\frac{2}{3} \quad -\frac{2}{3}$

$y = -\frac{1}{6} - \frac{2}{3}$

$y = -\frac{1}{6} - \frac{4}{6}$

$y = -\frac{5}{6}$

Exploration #1:

1. What are *variable terms*?

$3x, y$, any letter w/ coefficient

2. What are *like terms*?

$3x, 2x \rightarrow$ like terms
 $x^2, 3x^2$

same variable raised to same power

3. How do I multiply $2(x+7)$?

$2 \cdot x + 2 \cdot 7$
 $2x + 14$

Notes:

Solving linear equations may require more than one step.

Multi-step equations are like onions, they have many layers. We peel each layer to isolate the variable.



Example: $4 = \frac{2(x+3)-8}{3}$ has a bunch of layers! We will come back to this problem 😊

Example #1: Solve the following equations.

1. $3x + 7 = -8$
 $-7 \quad -7$

$$\frac{3x}{3} = \frac{-15}{3}$$

$$\boxed{x = -5}$$

Check:

$$3(-5) + 7 \stackrel{?}{=} -8$$

$$-15 + 7 \stackrel{?}{=} -8$$

$$-8 = -8 \checkmark$$

2. $7x - 3x - 8 = 24$
 like terms

$$4x - 8 = 24$$

$$+8 \quad +8$$

$$\frac{4x}{4} = \frac{32}{4}$$

$$\boxed{x = 8}$$

Check:

$$7(8) - 3(8) - 8 \stackrel{?}{=} 24$$

$$56 - 24 - 8 \stackrel{?}{=} 24$$

$$24 = 24 \checkmark$$

You practice: Solve the following equations.

1. $2y + 5 = 1$
 $-5 \quad -5$

$$\frac{2y}{2} = \frac{-4}{2}$$

$$\boxed{y = -2}$$

check:

$$2(-2) + 5 \stackrel{?}{=} 1$$

$$-4 + 5 \stackrel{?}{=} 1$$

$$1 = 1 \checkmark$$

2. $w - 4 + 5w = 14$

$$6w - 4 = 14$$

$$+4 \quad +4$$

$$\frac{6w}{6} = \frac{18}{6}$$

$$\boxed{w = 3}$$

check:

$$3 - 4 + 5(3) \stackrel{?}{=} 14$$

$$3 - 4 + 15 \stackrel{?}{=} 14$$

$$14 = 14 \checkmark$$

Example #2: Solve the following equations.

1. $5x + 3(x + 4) = 28$

$$5x + 3x + 12 = 28$$

$$8x + 12 = 28$$

$$-12 \quad -12$$

$$\frac{8x}{8} = \frac{16}{8}$$

$$\boxed{x = 2}$$

check:

$$5(2) + 3(2 + 4) \stackrel{?}{=} 28$$

$$5(2) + 3(6) \stackrel{?}{=} 28$$

$$10 + 18 \stackrel{?}{=} 28$$

$$28 = 28 \checkmark$$

2. $8x - 2(x + 7) = 16$

$$8x - 2x - 14 = 16$$

$$6x - 14 = 16$$

$$+14 \quad +14$$

$$\frac{6x}{6} = \frac{30}{6}$$

$$\boxed{x = 5}$$

check:

$$8(5) - 2(5 + 7) \stackrel{?}{=} 16$$

$$8(5) - 2(12) \stackrel{?}{=} 16$$

$$40 - 24 \stackrel{?}{=} 16$$

$$16 = 16 \checkmark$$

3. $4 = \frac{2}{3}(x + 3)$

$$\frac{3}{2} \left(\frac{4}{1} \right) = \left(\frac{2}{3} (x + 3) \right) \frac{3}{2}$$

$$\frac{12}{2} = x + 3$$

$$6 = x + 3$$

$$-3 \quad -3$$

$$\boxed{3 = x}$$

check:

$$4 \stackrel{?}{=} \frac{2}{3}(3 + 3)$$

$$4 \stackrel{?}{=} \frac{2}{3}(6)$$

$$4 = 4 \checkmark$$

You practice: Solve the following equations.

1. $\frac{6(x+2)}{6} = \frac{15}{6}$

$$x + 2 = \frac{5}{2}$$

$$-2 \quad -2$$

$$x = \frac{5}{2} - \frac{4}{2}$$

$$\boxed{x = \frac{1}{2}}$$

2. $8 - 4(x + 1) = 8$

$$8 - 4x - 4 = 8$$

$$4 - 4x = 8$$

$$-4 \quad -4$$

$$\frac{-4x}{-4} = \frac{4}{-4}$$

$$\boxed{x = -1}$$

$$-\frac{5}{33}(-9) = \left(-\frac{3}{5}(x+1)\right) - \frac{5}{3}$$

$$-\frac{5}{3} \cdot -\frac{9}{1} = x + 1$$

$$\frac{45}{3} = x + 1$$

$$15 = x + 1$$

$$-1 \quad -1$$

$$\boxed{14 = x}$$

CHALLENGE: Solve the equation: $4 = \frac{2(x+3)-8}{3}$

$$12 = 2(x+3) - 8$$

$$+8 \quad +8$$

$$\frac{20}{2} = \frac{2(x+3)}{2}$$

$$10 = x + 3$$

$$-3 \quad -3$$

$$\boxed{7 = x}$$