

Section 6-2: Multi-Step Equations

Review:

$$3x + 2x - 4$$

$$5x - 4$$

$$5(y + 2) - 4$$

$$5y + 10 - 4$$

$$5y + 6$$

$$7a - 4 - 2a + 3$$

$$5a - 1$$

$$6 + 3(b - 9)$$

$$6 + 3b - 27$$

$$3b - 21$$

**Remember, solving an equation
is like balancing a scale.**



**What you do to one side, you
must do to the other side.**

How might you solve these?

$$4(x + 2) = 32$$

$$4x + \cancel{8} = 32$$
$$- \cancel{8} \quad - 8$$

$$\cancel{4}x = 24$$
$$\cancel{4} \quad \cancel{4}$$

$$x = 6$$

$$5y + 2 - 3y = 4$$

$$2y + \cancel{2} = 4$$
$$- \cancel{2} \quad - 2$$

$$\cancel{2}y = 2$$
$$\cancel{2} \quad \cancel{2}$$
$$y = 1$$

*Remember that the variable must end up by itself on one side of the equal sign and the numbers must all be moved to the other side of the equal sign.

Solving Multi-Step Equations:

- 1. Simplify each side of the equation using the distributive property or combining like terms.**
- 2. Get the variable alone by adding or subtracting on both sides of the equation.**
- 3. Multiply or Divide to solve for the variable.**
- 4. Check your answer.**

Ex 1:

$$3(w + 3) = 27$$

$$\begin{array}{r} 3w + 9 = 27 \\ -9 \quad -9 \end{array}$$

$$\begin{array}{r} 3w = 18 \\ \div 3 \quad \div 3 \end{array}$$

$$w = 6$$

Check:
 $3(6 + 3)$

$$3(9)$$

$$27 \checkmark$$

Ex 2:

$$3g + 4g - 2 = 12$$

$$\begin{array}{r} 7g - 2 = 12 \\ +2 \quad +2 \end{array}$$

$$\begin{array}{r} \cancel{7}g = 14 \\ \cancel{7} \end{array}$$

$$g = 2$$

Check:

$$3(2) + 4(2) - 2$$

$$6 + 8 - 2$$

$$14 - 2$$

$$12 \checkmark$$

Ex 3:

$$3x + 4 = 5x - 2$$

$$\begin{array}{r} +2 \qquad \qquad +2 \\ \cancel{3x} + 6 = 5x \\ -3x \qquad \qquad -3x \end{array}$$

$$\begin{array}{r} 2/6 = \\ \cancel{3} = x \end{array}$$

Check:

$$\begin{array}{r} 3(3) + 4 \stackrel{?}{=} 5(3) - 2 \\ 9 + 4 \qquad \qquad 15 - 2 \\ 13 \qquad \qquad \qquad = 13 \checkmark \end{array}$$

Ex 4:

$$4g + 2.5 - 3g = 8$$

$$\begin{array}{r} 1g + 2.5 \\ - 2.5 \\ \hline 1g = 5.5 \end{array}$$

$$1g = 5.5$$

$$g = 5.5$$

Ex 5:

$$\frac{4}{5}h - 2 = \frac{2}{5}h + 8$$

$$\frac{4}{5}h + 2 = \frac{2}{5}h + 10$$

$$\frac{2}{5}h = 10$$

$$\frac{2}{5}h = 10$$

2/5 h = 10

$$h = \frac{10 \cdot 5}{2}$$

h = 25

Ex 6:

$$\frac{1}{3}(x - 6) = 4$$

$$\frac{1}{3}x - \frac{6}{3} = 4$$

$$\frac{1}{3}x - \cancel{2} = 4$$

$$\frac{1}{3}x = 6$$

$$\cancel{\frac{1}{3}} \cdot \frac{1}{3}x = \frac{6}{1} \cdot \frac{3}{1}$$

$$x = 18$$