

## Lesson 2.4

# Equations with Variables on Both Sides

- When solving equations with variables on both sides, the goal is still to get ONE variable isolated.
- Like all equations, we are still needing to simplify each side of the equation then do opposite operations.

Examples

$$1. \begin{array}{r|l} 3x + 16 & = x - 36 \\ +36 & +36 \\ \hline 3x + 52 & = x \\ -3x & -3x \\ \hline 52 & = -36 \\ -2 & -2 \\ \hline -2 & = -2 \end{array} \quad x = -26$$

$$2. \begin{array}{r|l} 14 - 3y & = 4y \\ +3y & +3y \\ \hline 14 & = 7y \\ \div 7 & \div 7 \\ \hline 2 & = y \end{array}$$

$$3. \begin{array}{r|l} p + 5 & = 2p - 2 \\ +2 & +2 \\ \hline p + 7 & = 2p \\ -p & -p \\ \hline 7 & = p \end{array}$$

$$4. \begin{array}{r|l} -12 - 2n + 2 + 4 & + 4n = 2n - 6 + 2n \\ \hline -6 + 2n & = 4n - 6 \\ -2n & -2n \\ \hline -6 & = 2n - 6 \\ +6 & +6 \\ \hline 0 & = 2n \\ \div 2 & \div 2 \\ \hline 0 & = n \end{array}$$

$$5. 4(2r - 8) = 1/7(49r + 70)$$

$$\begin{array}{r} 8r - 32 = 7r + 10 \\ -7r + 32 -7r + 32 \\ \hline r = 42 \end{array}$$

$$7. \frac{6x - 9}{5} = 3x$$

$$\begin{array}{r} 6x - 9 = 15x \\ -6x \quad -6x \\ \hline -9 = 9x \end{array}$$

$$\begin{array}{r} -9 = 9x \\ \frac{-9}{9} = \frac{9x}{9} \\ -1 = x \end{array}$$

$$6. 5 - 1/2(x - 6) = 4$$

$$5 - 1/2x + 3 = 4$$

$$-1/2x + 8 = 4$$

$$\begin{array}{r} -1/2x + 8 = 4 \\ -8 \quad -8 \\ \hline -1/2x = -4 \end{array} \cdot -2$$

$$x = 8$$

$$8. \frac{3m - 2}{5} = \frac{7}{10} \cdot 5 \quad \frac{7}{10} \cdot 5 = \frac{35}{10}$$

$$2 \left( 3m - 2 = \frac{7}{2} \right)$$

$$\begin{array}{r} 6m - 4 = 7 \\ +4 \quad +4 \\ \hline 6m = 11 \\ \frac{6m}{6} = \frac{11}{6} \end{array}$$

$$m = \frac{11}{6}$$