

Lesson 7-1

Example 1 Equations with Variables on Each Side

Solve $7x = 6x + 8$. Check your solution.

$$\begin{array}{ll} 7x = 6x + 8 & \text{Write the equation.} \\ 7x - 6x = 6x - 6x + 8 & \text{Subtract } 6x \text{ from each side.} \\ x = 8 & \text{Simplify.} \end{array}$$

To check your solution, replace x with 8 in the original equation.

$$\begin{array}{ll} \text{CHECK} & 7x = 6x + 8 & \text{Write the equation.} \\ & 7(8) = 6(8) + 8 & \text{Replace } x \text{ with 8.} \\ & 56 = 48 + 8 & \text{Check to see whether this statement is true.} \\ & 56 = 56 \checkmark & \text{The statement is true.} \end{array}$$

The solution is 8.

Example 2 Equations with Variables on Each Side

a. Solve $11 + 5w = 8w - 4$. Check your solution.

$$\begin{array}{ll} 11 + 5w = 8w - 4 & \text{Write the equation.} \\ 11 + 5w - 5w = 8w - 5w - 4 & \text{Subtract } 5w \text{ from each side.} \\ 11 = 3w - 4 & \text{Simplify.} \\ 11 + 4 = 3w - 4 + 4 & \text{Add 4 to each side.} \\ 15 = 3w & \text{Simplify.} \\ 5 = w & \text{Mentally divide each side by 3.} \end{array}$$

$$\begin{array}{ll} \text{CHECK} & 11 + 5w = 8w - 4 & \text{Write the equation.} \\ & 11 + 5(5) = 8(5) - 4 & \text{Replace } w \text{ with 5.} \\ & 36 = 36 \checkmark & \text{The solution checks.} \end{array}$$

b. Solve $1.2m - 4.5 = 6.4m + 5.9$.

$$\begin{array}{ll} 1.2m - 4.5 = 6.4m + 5.9 & \text{Write the equation.} \\ 1.2m - 1.2m - 4.5 = 6.4m - 1.2m + 5.9 & \text{Subtract } 1.2m \text{ from each side.} \\ -4.5 = 5.2m + 5.9 & \text{Simplify.} \\ -4.5 - 5.9 = 5.2m + 5.9 - 5.9 & \text{Subtract 5.9 from each side.} \\ -10.4 = 5.2m & \text{Simplify.} \\ \frac{-10.4}{5.2} = \frac{5.2m}{5.2} & \text{Divide each side by 5.2.} \\ -2 = m & \text{Check your solution.} \end{array}$$

The solution is -2.

Example 2 Use an Equation to Solve a Problem

CAR RENTAL The ABC Car Rental Co. charges a flat fee of \$40 plus \$0.20 per mile. The XYZ Car Rental Co. charges a flat fee of \$60 plus \$0.15 per mile. What number of miles driven will result in the same cost from each company?

Let x represent the number of miles driven.

Words	$\underbrace{\$40 \text{ plus } \$0.20 \text{ per mile}}$	$\underbrace{\$60 \text{ plus } \$0.15 \text{ per mile}}$
Variables	$40 + 0.20x$	$60 + 0.15x$
Equation	$40 + 0.20x = 60 + 0.15x$	Write an equation.
	$40 + 0.20x - 0.15x = 60 + 0.15x - 0.15x$	Subtract $0.15x$ from each side.
	$40 + 0.05x = 60$	Simplify.
	$40 - 40 + 0.05x = 60 - 40$	Subtract 40 from each side.
	$0.05x = 20$	Simplify.
	$\frac{0.05x}{0.05} = \frac{20}{0.05}$	Divide each side by 0.05.
	$x = 400$	Simplify.

The cost will be the same for both companies if 400 miles are driven.