

Lesson 3-3

Example 1 Solve Using Multiplication by a Positive Number

Solve $\frac{x}{5} = -\frac{1}{6}$. Then check your solution.

$$\frac{x}{5} = -\frac{1}{6} \quad \text{Original equation.}$$

$$5\left(\frac{x}{5}\right) = \left(-\frac{1}{6}\right)5 \quad \text{Multiply each side by 5.}$$

$$x = -\frac{5}{6} \quad 5\left(\frac{x}{5}\right) = x \text{ and } \left(-\frac{1}{6}\right)5 = -\frac{5}{6}.$$

Check $\frac{x}{5} = -\frac{1}{6}$ Original equation

$$\frac{-\frac{5}{6}}{5} = -\frac{1}{6} \quad \text{Substitute } -\frac{5}{6} \text{ for } x.$$

$$-\frac{1}{6} = -\frac{1}{6} \quad \text{The solution is } -\frac{5}{6}.$$

Example 2 Solve Using Multiplication by a Fraction

Solve $\frac{7}{8}r = -1\frac{1}{4}$.

$$\frac{7}{8}r = -1\frac{1}{4} \quad \text{Original equation}$$

$$\frac{7}{8}r = -\frac{5}{4} \quad \text{Rewrite the right side as an improper fraction.}$$

$$\frac{8}{7}\left(\frac{7}{8}\right)r = \frac{8}{7}\left(-\frac{5}{4}\right) \quad \text{Multiply both sides by } \frac{8}{7}, \text{ the reciprocal of } \frac{7}{8}.$$

$$r = -\frac{40}{28} \text{ or } -\frac{10}{7} \quad \text{Check this result.}$$

The solution is $-\frac{10}{7}$.

Example 3 Solve by Using Multiplication by a Negative Number

Solve $-\frac{s}{8} = -1\frac{1}{5}$.

$$-\frac{s}{8} = -1\frac{1}{5}$$

Original equation

$$-\frac{1}{8}s = -\frac{6}{5}$$

Rewrite the right side as an improper fraction.

$$-8\left(-\frac{1}{8}s\right) = -8\left(-\frac{6}{5}\right)$$

Multiply each side by -8 , the reciprocal of $-\frac{1}{8}$.

$$s = \frac{48}{5}$$

Check this result.

The solution is $\frac{48}{5}$.

Example 4 Write and Solve an Equation Using Multiplication

One mile is equal to approximately 1.6 kilometers. A local running club is holding a 10 kilometer race. What is the length of the race in miles?

Words 1.6 kilometers times the number of miles equals the number of kilometers in the race.

Variable Let m = the number of miles

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$$\underbrace{1.6 \text{ kilometers}}_{1.6} \underbrace{\text{times}}_{\times} \underbrace{\text{number of miles}}_m \underbrace{\text{equals}}_{=} \underbrace{\text{number of kilometers in the race}}_{10}$$

$$1.6m = 10$$

Original equation

$$\frac{1}{1.6}(1.6m) = \frac{1}{1.6}(10)$$

Multiply each side by $\frac{1}{1.6}$.

$$m = 6.25$$

$$\frac{1}{1.6}(1.6) = 1 \text{ and } \frac{1}{1.6}(10) = 6.25$$

The race is 6.25 miles.

Example 5 Solve Using Division by a Positive Number

Solve $2.12b = 9.01$. Then check your solution

$$2.12b = 9.01$$

Original equation

$$\frac{2.12b}{2.12} = \frac{9.01}{2.12}$$

Divide each side by 2.12.

$$b = 4.25$$

$$\frac{2.12b}{2.12} = b \text{ and } \frac{9.01}{2.12} = 4.25$$

Check

$$\begin{aligned} 2.12b &= 9.01 \\ 2.12(4.25) &=? 9.01 \\ 9.01 &= 9.01 \end{aligned}$$

Original equation
Substitute 4.25 for b .

The solution is 4.25.

Example 6 Solve Using Division by a Negative Number

Solve $-9t = -63$.

$$-9t = -63$$

Original equation

$$\frac{-9t}{-9} = \frac{-63}{-9}$$

Divide each side by -9 .

$$t = 7$$

$$\frac{-9t}{-9} = t \text{ and } \frac{-63}{-9} = 7$$

The solution is 7.

Example 7 Write and Solve an Equation Using Division

Write and solve an equation for the problem below. Then solve the equation.
Eight times a number is negative sixty-four.

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$$\underbrace{\text{eight}}_8 \quad \underbrace{\text{times}}_{\times} \quad \underbrace{\text{a number}}_n \quad \underbrace{\text{is}}_{=} \quad \underbrace{\text{negative sixty four}}_{-64}$$

$$8n = -64$$

Original equation

$$\frac{8n}{8} = \frac{-64}{8}$$

Divide each side by 8.

$$n = -8$$

Check this result.

The solution is -8 .