

2.6

Solving Equations Using Multiplication or Division

Goal: Solve equations using multiplication or division.

Division Property of Equality

Words Dividing each side of an equation by the same nonzero number produces an equivalent equation.

Numbers If $3x = 12$, then $\frac{3x}{\square} = \frac{12}{\square}$, or $x = \square$.

Algebra If $ax = b$ and $a \neq 0$, then $\frac{ax}{\square} = \frac{b}{\square}$, or $x = \square$.

Remember that you cannot divide a number or an expression by 0.

Example 1 Solving an Equation Using Division

Solve $-7x = 42$.

Solution

$$-7x = 42$$

Write original equation.

$$\frac{-7x}{\square} = \frac{42}{\square}$$

Divide each side by \square .

$$x = \square$$

Simplify.

Answer: The solution is \square .

Check: $-7x = 42$ Write original equation.

$$-7(\square) \stackrel{?}{=} 42$$

Substitute for x .

$$\square \square 42 \square$$

Checkpoint Solve the equation. Check your solution.

1. $5x = 45$

2. $-56 = -8y$

Multiplication Property of Equality

Words Multiplying each side of an equation by the same nonzero number produces an equivalent equation.

Numbers If $\frac{x}{3} = 12$, then $\square \cdot \frac{x}{3} = \square \cdot 12$, or $x = \square$.

Algebra If $\frac{x}{a} = b$ and $a \neq 0$, then $\square \cdot \frac{x}{a} = \square \cdot b$, or $x = \square$.

Example 2 Solving an Equation Using Multiplication

Solve $5 = \frac{w}{11}$.

Solution

$$5 = \frac{w}{11}$$

Write original equation.

$$\square \cdot 5 = \square \cdot \frac{w}{11}$$

Multiply each side by \square .

$$\square = w$$

Simplify.

Answer: The solution is \square .

✔ **Checkpoint** Solve the equation. Check your solution.

3. $\frac{m}{4} = 11$

4. $-9 = \frac{c}{6}$