

## Lesson 3 - Solve Equations with Rational Coefficients

**Multiplicative inverses, or reciprocals,** are two numbers whose product is 1. To solve an equation in which the coefficient is a fraction, multiply each side of the equation by the reciprocal of the coefficient.

### Example 1

Solve  $15 = 0.5n$ . Check the solution.

$$15 = 0.5n \quad \text{Write the equation.}$$

$$\frac{15}{0.5} = \frac{0.5n}{0.5} \quad \text{Division Property of Equality}$$

$$30 = n \quad \text{Simplify.}$$



### Example 2

Solve  $\frac{4}{5}x = 8$ . Check your solution.

$$\frac{4}{5}x = 8 \quad \text{Write the equation.}$$

$$\left(\frac{5}{4}\right)\frac{4}{5}x = \left(\frac{5}{4}\right)8 \quad \text{Multiply each side by the reciprocal of } \frac{4}{5}, \frac{5}{4}.$$

$$x = 10 \quad \text{Simplify.}$$

Sign rules for multiplication:

$$\begin{aligned} (+)(+) &= (+) & (+)(-) &= (-) \\ (-)(-) &= (+) & (-)(+) &= (-) \\ (+)(-) &= (-) & (-)(-) &= (+) \end{aligned}$$

Handwritten division problems:

$$2 \overline{) 8}$$

$$10 \overline{) 40}$$

$$14 \overline{) 56}$$

### Exercises

Solve each equation. Check your solution.

THE COEFFICIENT IS 0.7

1.  $4.9 = 0.7m$

$$\frac{4.9}{0.7} = \frac{0.7m}{0.7}$$

$$7 = m$$

Handwritten notes:  $0.7 \leftarrow 1$ ,  $\times 7 \leftarrow 0$ ,  $\sqrt{4.9 \leftarrow 1}$

THE COEFFICIENT IS  $-\frac{6}{18}$

2.  $-\frac{18}{6} \left(-\frac{1}{2}\right) = -\frac{6}{18}h \left(-\frac{18}{6}\right)$

$$\frac{18}{12} = h$$

$$\frac{3}{2} = h \quad \frac{3}{2} = 1\frac{1}{2}$$

THE COEFFICIENT IS 4

3.  $-2.8 = 4b$

$$\frac{-2.8}{4} = \frac{4b}{4}$$

$$-0.7 = b$$

Handwritten notes:  $-0.7 \leftarrow 1$ ,  $\times 4 \leftarrow 0$ ,  $\sqrt{-2.8 \leftarrow 1}$

Handwritten division problems:

$$0.7 \overline{) 4.9}$$

$$7 \overline{) 49}$$

THE COEFFICIENT IS  $\frac{3}{5}$

4.  $\frac{5}{3} \left(\frac{3}{5}x\right) = \frac{12}{1} \left(\frac{5}{3}\right)$

$$x = \frac{60}{3}$$

$$x = 20$$

CHECK:  $\frac{3}{5} \left(\frac{20}{1}\right) = 12$

$$\frac{60}{5} = 12 \checkmark$$

5.  $16 = \frac{10}{3}a$

6.  $9 = 0.3n$

7.  $\frac{15}{7}y = 3$

8.  $21 = 0.75a$

9.  $\frac{14}{3} = -\frac{7}{9}b$

## Lesson 3 Skills Practice

### Solve Equations with Rational Coefficients

Solve each equation. Check your solution.

1.  $3.4a = 57.8$

2.  $-2 = 0.8n$

3.  $\frac{5}{6}k = -20$

7.  $\frac{3}{5}y = 6$

8.  $-15 = \frac{3}{7}b$

9.  $\frac{6}{7}c = 18$

13.  $-\frac{m}{26} = -\frac{1}{2}$

14.  $0.6 = \frac{n}{5}$

15.  $1.5r = -5.07$

19.  $-14 = \frac{7}{9}m$

20.  $3.2 = \frac{t}{8}$

~~21.~~  $\frac{21}{18} = -\frac{1}{9}$