

Lesson 3-5

Example 1

Solve the proportion $\frac{6}{10} = \frac{9}{n}$, $n \neq 0$. Check the solution.

Solution

$$\begin{aligned} \frac{6}{10} &= \frac{9}{n} \\ 6 \cdot n &= 10 \cdot 9 && \text{Find the cross-products.} \\ 6n &= 90 \\ \frac{6n}{6} &= \frac{90}{6} && \text{Divide each side by 6.} \\ n &= 15 \end{aligned}$$

$$\begin{aligned} \text{Check } \frac{6}{10} &= \frac{9}{n} \\ \frac{6}{10} &\stackrel{?}{=} \frac{9}{15} \\ \frac{3}{5} &= \frac{3}{5} \quad \checkmark \end{aligned}$$

Example 2

LANDSCAPING A landscaper is able to trim 3 hedges in 12 minutes. At this rate, how long would it take the landscaper to trim 15 hedges?

Solution

Set up a proportion. Let x = the amount of time to trim 15 hedges.

$$\begin{aligned} \frac{\text{number of hedges}}{\text{minutes}} & \quad \frac{3}{12} = \frac{15}{x} && \frac{\text{number of hedges}}{\text{minutes}} \\ 3 \cdot x &= 12 \cdot 15 && \text{Find the cross-products.} \\ 3x &= 180 \\ \frac{3x}{3} &= \frac{180}{3} \\ x &= 60 \end{aligned}$$

It would take the landscaper 60 minutes to trim 15 hedges.

Example 3

Solve each proportion. Check the solution.

a. $\frac{48}{n+1} = 12, n+1 \neq 0$

b. $\frac{4p+1}{3} = \frac{8p-1}{5}$

Solution

a. $\frac{48}{n+1} = 12$

$$\frac{48}{n+1} = \frac{12}{1}$$

$$48 \cdot 1 = 12(n+1)$$

$$48 = 12n + 12$$

$$48 - 12 = 12n + 12 - 12$$

$$36 = 12n$$

$$\frac{36}{12} = \frac{12n}{12}$$

$$3 = n$$

Check $\frac{48}{n+1} = 12$

$$\frac{48}{3+1} \stackrel{?}{=} 12$$

$$\frac{48}{4} \stackrel{?}{=} 12$$

$$12 = 12 \quad \checkmark$$

b. $\frac{4p+1}{3} = \frac{8p-1}{5}$

$$5(4p+1) = 3(8p-1)$$

$$20p+5 = 24p-3$$

$$20p - 20p + 5 = 24p - 20p - 3$$

$$5 = 4p - 3$$

$$5 + 3 = 4p - 3 + 3$$

$$8 = 4p$$

$$\frac{8}{4} = \frac{4p}{4}$$

$$2 = p$$

Check $\frac{4p+1}{3} = \frac{8p-1}{5}$

$$\frac{4 \cdot 2 + 1}{3} \stackrel{?}{=} \frac{8 \cdot 2 - 1}{5}$$

$$\frac{8 + 1}{3} \stackrel{?}{=} \frac{16 - 1}{5}$$

$$\frac{9}{3} \stackrel{?}{=} \frac{15}{5}$$

$$3 = 3 \quad \checkmark$$