

SOLVING PROPORTIONS

#9

A **proportion** is an equation stating that two ratios (fractions) are equal. To solve a proportion, begin by eliminating fractions. This means using the inverse operation of division, namely, multiplication. Multiply both sides of the proportion by one or both of the denominators. Then solve the resulting equation in the usual way.

Example 1

$$\frac{x}{3} = \frac{5}{8}$$

Undo the division by 3 by multiplying both sides by 3.

$$(3)\frac{x}{3} = \frac{5}{8}(3)$$

$$x = \frac{15}{8} = 1\frac{7}{8}$$

Example 2

$$\frac{x}{x+1} = \frac{3}{5}$$

Multiply by 5 and (x+1) on both sides of the equation.

$$5(x+1)\frac{x}{x+1} = \frac{3}{5}(5)(x+1)$$

Note that $\frac{(x+1)}{(x+1)} = 1$ and $\frac{5}{5} = 1$, so $5x = 3(x+1)$

$$5x = 3x + 3 \Rightarrow 2x = 3 \Rightarrow x = \frac{3}{2} = 1\frac{1}{2}$$

Solve for x or y.

1. $\frac{2}{5} = \frac{y}{15}$

2. $\frac{x}{36} = \frac{4}{9}$

3. $\frac{2}{3} = \frac{x}{5}$

4. $\frac{5}{8} = \frac{x}{100}$

5. $\frac{3x}{10} = \frac{24}{9}$

6. $\frac{3y}{5} = \frac{24}{10}$

7. $\frac{x+2}{3} = \frac{5}{7}$

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

9. $\frac{4x}{5} = \frac{x-2}{7}$

10. $\frac{3x}{4} = \frac{x+1}{6}$

11. $\frac{9-x}{6} = \frac{24}{2}$

12. $\frac{7-y}{5} = \frac{3}{4}$

13. $\frac{1}{x} = \frac{5}{x+1}$

14. $\frac{3}{y} = \frac{6}{y-2}$

15. $\frac{4}{x} = \frac{x}{9}$

16. $\frac{25}{y} = \frac{y}{4}$

Answers

1. 6 2. 16 3. $\frac{10}{3} = 3\frac{1}{3}$ 4. $62\frac{1}{2}$ 5. $\frac{80}{9}$ 6. 4

7. $\frac{1}{7}$ 8. $4\frac{1}{2}$ 9. $\frac{-10}{23}$ 10. $\frac{2}{7}$ 11. -63 12. $\frac{13}{4}$

13. $\frac{1}{4}$ 14. -2 15. ± 6 16. ± 10