

Ratio and Proportion

A **ratio** is a relationship between two whole numbers. It can be written in two ways:

- with a colon 2:3
- as a fraction $\frac{2}{3}$

Each of the above are read as "the ratio of 2 to 3."

Two **equivalent ratios** are called a **proportion**.

Example:

$$\frac{2}{3} = \frac{8}{12}$$

The proportion above is read "2 is to 3 as 8 is to 12."

You can verify that 2 ratios are proportional by **cross-multiplying**.

$$\frac{2}{3} \times \frac{8}{12} \rightarrow 2 \cdot 12 = 3 \cdot 8 \rightarrow 24 = 24 \text{ yes!}$$

To solve for a missing number in a proportion:

1. Cross-multiply.
2. Multiply both sides by the **reciprocal** of the variable's **coefficient**.

$$\frac{2}{5} = \frac{x}{11}$$

$$5x = 22$$

$$\frac{1}{5} \cdot 5x = 22 \cdot \frac{1}{5}$$

$$x = \frac{22}{5}$$