

Solving Proportions Guided Notes

What is a Proportion?

A proportion is an equation having two ratios equal.

$$\frac{a}{b} = \frac{c}{d}$$

b & c



means

a & d



extremes

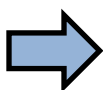
Methods of Solving Proportions

In solving proportions, we simplify both sides of the equality by using different properties to single out the variable whose value is to be found. There are two ways of solving a proportion.

1. Using Multiplication property of Equality

In this method, we multiply both sides of the proportion by a suitable number to single out the variable on one side and simplify the other side to find the value of the variable.

$$\frac{a}{b} = \frac{x}{d}$$



$$d \times \frac{a}{b} = \frac{x}{d} \times d$$

Multiplication Property of Equality



$$x = \frac{ad}{b}$$

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Problem 1: Solving the proportion given below using the Multiplication property of Equality.

$$\frac{x}{15} = \frac{4}{5}$$

$$\frac{x}{15} = \frac{4}{5} \quad \Rightarrow \quad 15 \times \frac{x}{15} = \frac{4}{5} \times 15$$

Multiplication Property of Equality

$$\Rightarrow \quad x = 4 \times 3$$

$$\Rightarrow \quad x = 12$$

2. Cross-Product Property in Proportions

In a proportion, the product of extremes is equal to the product of means i.e. we cross multiply the terms on both sides of equality and simplify to solve for the given variable.

$$\frac{a}{b} = \frac{x}{d}$$

Cross Multiply

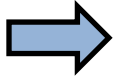
$$\Rightarrow \quad ad = bx$$

$$\Rightarrow \quad x = \frac{ad}{b}$$

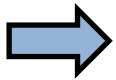
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Problem 2: Solve the proportion $\frac{4}{3} = \frac{y+2}{6}$.

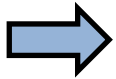
Apply the cross product property of proportions:



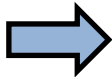
$$6 \times 4 = 3 \times (y + 2)$$



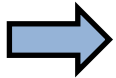
$$24 = 3y + 6$$



$$24 - 6 = 3y$$



$$3y = 18$$



$$y = 6$$