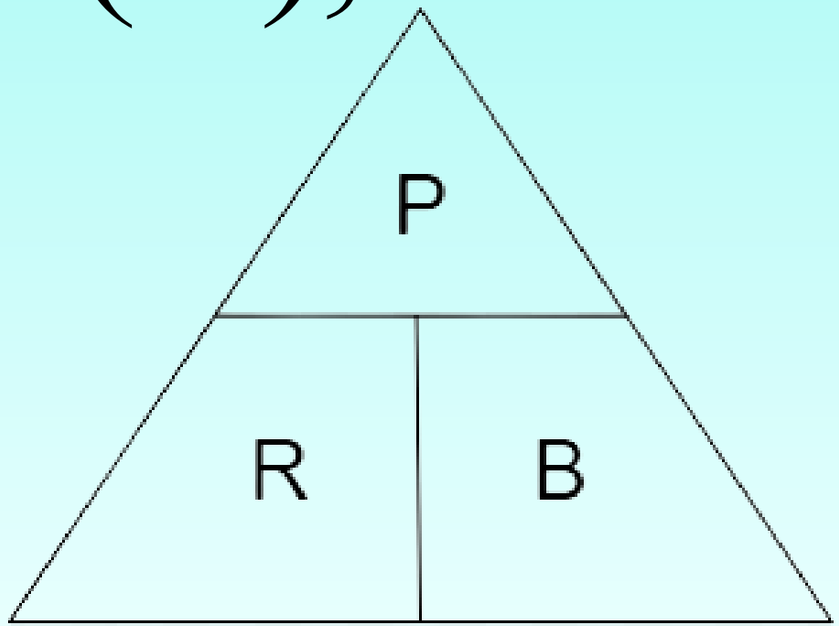
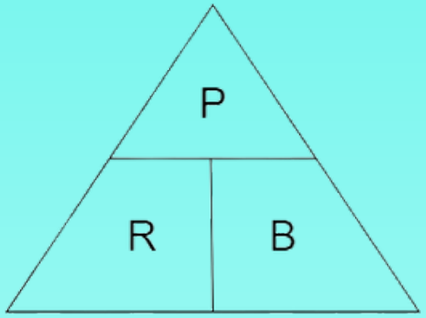
Finding Percentage, Rate, and Base

The Techan's Triangle is a helpful tool to remember how to use the formulas for percentage (P), rate (R), and base (B).





Here's how you can use it:
To find the percentage (P): **cover P** in the triangle; since R (rate) and B (base) are next to each other, this means you multiply rate and base together **(P = R × B).**

To find the base (B), **cover B** in the triangle. Since P (percentage) is over R (rate), you divide the percentage by the rate **(B = P ÷ R).**

To find the rate (R), **cover R** in the triangle. Since P (percentage) is over B (base), you divide the percentage by the base **(R = P ÷ B).**

This **triangle** helps you quickly recall which operation to use **(multiplication or division)** depending on which value you're solving for.

Finding the Percentage
Example 1: Find 50% of 80

Using Decimal

$50\% \times 80 = n$

↓

$0.50 \times 80 = \mathbf{40}$

Change the rate to decimal.

Using a Proportion

$$\frac{50}{100} = \frac{n}{80}$$ Think: $50\% = \frac{50}{100}$

$$\frac{100n}{100} = \frac{4,000}{100}$$

n = 40

Example 2:

There are 300 pupils in a school. If 40% of them are boys, how many boy scouts does the school have?

$$R = 40\%,\ B = 300;\ P = ?$$

Using Decimal

$$40\% \times 300 = n$$

$$\downarrow$$

$$0.40 \times 300 = \mathbf{120}$$

Change the rate to decimal.

Using a Proportion

$$\frac{40}{100} = \frac{n}{300}$$

$$\frac{100n}{100} = \frac{12,000}{100}$$

$$\mathbf{n = 120}$$

Finding the Rate
Example: 15 is what percent of 60?

Think; n% of 60 = 15

Rate Base Percentage

Using Fraction

n% of 60 = 15

$$\frac{n}{100} \times 60 = 15$$

$$\frac{60n}{100} = 15$$

$$60n = 15 \times 100$$

$$60n = 1500$$

$$\frac{60n}{60} = \frac{1,500}{60}$$

n = 25

Using Proportion

n% of 60 = 15

$$\frac{n}{100} = \frac{15}{60}$$

100 × 15 = 1,500

$$n : 100 = 15 : 60$$

n × 60 = 60n

60n = 1,500

$$\frac{60n}{60} = \frac{1,500}{60}$$

n = 25

Finding the Base

In Mrs. Borja's Math class, 8 pupils got high scores on the test. If this is 20% of the total number of pupils in the class, how many pupils does he have in all?

Solution: R = 20%, P = 8, B = ?

Using Decimal

20% of $n = 8$

$0.20 \times n = 8$

$$\frac{0.20n}{0.20} = \frac{8}{0.20}$$

n = 40

Using Proportion

$$\frac{20}{100} = \frac{8}{n} \longrightarrow 20 : 100 = 8 : n$$

$20 \times n = 100 \times 8$

$20n = 800$

$$\frac{20n}{20} = \frac{800}{20}$$

n = 40