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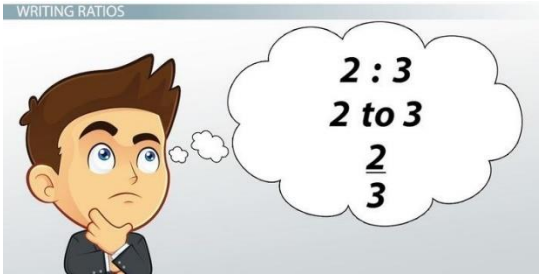
Comparing Quantities

Ratios

The ratio is used to compare two quantities. These quantities must have the same units.

The ratio is represented by **":",** which is read as **"to".** We can write it in the form of "**fraction**".



Example

Write the ratio of the height of Sam to John, where Sam's height is 175 cm and john's height is 125 cm.

Solution

The ratio of Sam's height to John's height is 175: 125 = 7: 5.

We can write it in fraction as 7/5.

Equivalent Ratios

The equivalent ratio is like the equivalent fractions so to find the equivalent ratio we need to write it in the form of a fraction. To find the equivalent ratio we need to multiply or divide the numerator and denominator with the same number.

Example

Find the two equivalent ratios of 5: 20.

Solution

First multiply it by 2.

$$\frac{5}{20} \times \frac{2}{2} = \frac{10}{40}$$

Then divide it by 5

$$\frac{5}{20} \div \frac{5}{5} = \frac{1}{4}$$

So the two equivalent ratios are 10:40 and 1: 4.

To compare that the two ratios are equivalent or not we need to convert them in the form of like a fraction. Like fractions are the fractions with the same denominator.

Example

Check whether the ratios 2: 3 and 3: 4 are equivalent are not?

Solution

To check, first, we need to make their denominator same.

$$\frac{2}{3} = \frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$$

$$\frac{3}{4} = \frac{3}{4} \times \frac{3}{3} = \frac{9}{12}$$

$$\frac{9}{12} > \frac{8}{12} \text{ Which means } \frac{3}{4} > \frac{2}{3}.$$

Hence the ratio 2:3 is not equivalent to 3:4.

Proportion

Proportion shows the equality between two ratios. If two ratios are in proportion then these must be equal.

$$\frac{\text{the actual height of building}}{\text{actual height of tree}} = \frac{\text{height of building in drawing}}{\text{height of the tree in the drawing}}$$

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

How to solve proportion problems?

Example

If the cost of 8 strawberries is Rs. 64 then what will be the cost of 25 strawberries.

Solution

Using Unitary Method

Cost of 8 strawberries is 64 Rs.

$$\text{Cost of 1 strawberry} = \text{Rs. } \frac{64}{8}$$

$$\text{Cost of 25 strawberries} = \text{Rs. } \frac{64}{8} \times 25 = \text{Rs. } 200$$

Solution using proportion

Let the cost of 25 strawberries = Rs. x

Then 8:25 = 64: x

$$\frac{8}{25} = \frac{64}{x}$$

To solve this we use the cross-Multiplication

$$x = \frac{64 \times 25}{8} = 200$$

Hence the cost of 25 strawberries is Rs. 200