RATIOS

A DEFINITION

Definition Ratio

A **ratio** is a comparison of two quantities. The ratio 3 to 2 can be expressed as $3 : 2$ or $\frac{3}{2}$.

B PART-PART AND PART-WHOLE RATIOS

Definition Part-part Ratio

A **part-part ratio** compares two distinct parts of a whole.

Part 1 : Part 2

Ex: For one bowl of fruit juice, there are 3 cherries and 2 apples.

The ratio of cherries to apples is $3 : 2$.

Definition Part-whole Ratio

A **Part-whole ratio** compares one part of a whole to the whole.

Part 1 : Whole or Part 2 : Whole

Ex: If a juice is made with 1 lemon and 2 oranges, find the ratio of oranges to the total number of fruits.

Answer:

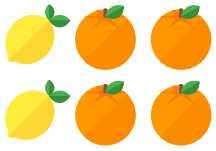
- The total number of fruits is $1 + 2 = 3$.
- The ratio of oranges to the total number of fruits is $\frac{2}{3}$.

C EQUAL RATIOS

Discover: Making Juice

- Let's make some fresh juice! For one glass of juice, we need 1 lemon and 2 oranges. The ratio of lemons to oranges is $1 : 2$.

- Now, if we want to make two glasses of juice, we need to double the ingredients.



- The ratio remains the same. The ratios are equal: $1:2 = 2:4$.

Definition Equal Ratios

Two ratios are **equal** if one can be expressed as a multiple of the other.

Method Using Fractions

To show that two ratios are equal, we can compare their related fractions. If the fractions are equal, then the ratios are equal.

Ex:

$$\text{As } \frac{1}{2} \overset{\times 2}{=} \frac{2}{4},\ 1:2 = 2:4$$

D PROPORTION

Discover: Imagine you're making a fruit juice mix. The recipe calls for 4 cups of orange juice and 2 cups of apple juice. This ratio of $4:2$ ensures the juice has the right flavor balance.But what if you want to make a larger batch? If you double the amount of orange juice, how much apple juice will you need to keep the same taste? Write your answer as a number of cups.

Answer: If you double the amount of orange juice from 4 cups to 8 cups, you also need to double the amount of apple juice from 2 cups to 4 cups to keep the same taste.
So, the new ratio is $8:4$, which is the same as the original ratio $4:2$.

Definition Proportion

A **proportion** states that two ratios are equal.

Ex: To make 1 chocolate cake, 4 eggs are needed. How many eggs are needed to make 2 cakes?

Answer: For 1 cake, it takes 4 eggs. Therefore, to maintain this proportion for 2 cakes, multiply both the number of cakes and the number of eggs by 2:

$$\frac{4}{1} \overset{\times 2}{=} \frac{8}{2}$$

Thus, to make 2 chocolate cakes, you need 8 eggs.