RATIO

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 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.

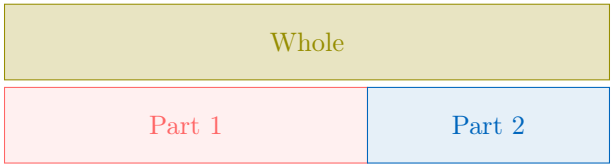
The ratio of cherries to apples is $3 : 2$.

C PART-WHOLE RATIOS

Definition Part-Whole Ratio

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

Part 1 : Whole or Part 2 : Whole



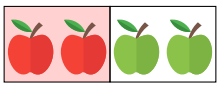
Ex: If a juice is made with 1 lemon and 2 oranges, find the ratio of oranges to the total number of fruits.

Answer:

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

D EQUIVALENT RATIOS

Discover: The ratio of red apples to all apples is $\frac{2}{4}$, which can be simplified to $\frac{1}{2}$ (half of the apples are red).



Definition **Equivalent 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:

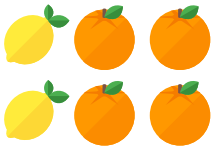
$$\text{As } \frac{1}{2} \overset{\times 2}{=} \frac{2}{4}, \; 1:2 = 2:4$$

E PROPORTION

Discover: Making Juice

- For one glass of juice, you need 1 lemon and 2 oranges. The ratio of lemons to oranges is $1:2$.

- To make two glasses of juice, double the ingredients: 2 lemons and 4 oranges.



- The juices are in proportion because the ratios are equivalent: $\frac{1}{2} = \frac{2}{4}$.

Definition **Proportion**

A **proportion** is an equation stating that two ratios are equivalent.

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

Answer: For 1 cake, you need 4 eggs. To find the number of eggs for 2 cakes, set up a proportion:

$$\frac{4 \text{ eggs}}{1 \text{ cake}} \overset{\times 2}{=} \frac{8 \text{ eggs}}{2 \text{ cakes}}$$

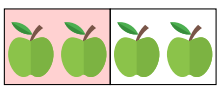
Thus, you need 8 eggs for 2 cakes.

F PART IN WHOLE-PART RELATIONSHIPS

Method **Finding Part in Whole-Part Relationships**

To find the number of apples corresponding to $\frac{1}{2}$ of 4 apples:

- **Draw the fraction:**



- **Count the apples in the colored part:** there are 2 apples.