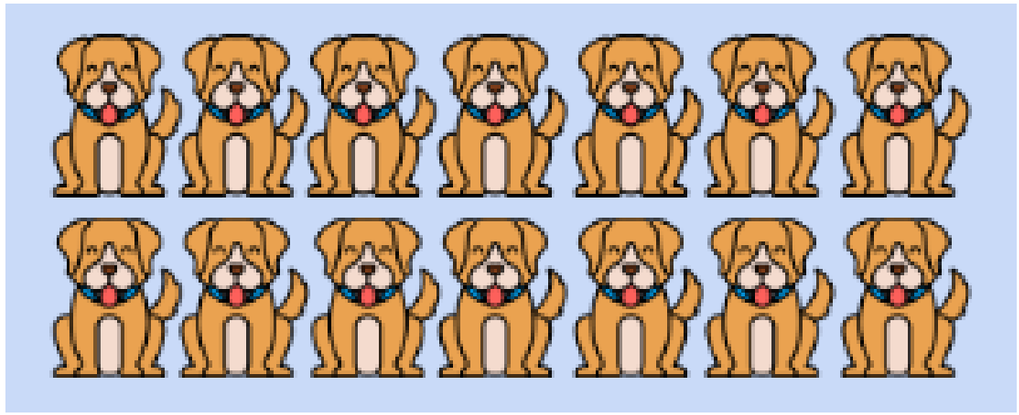
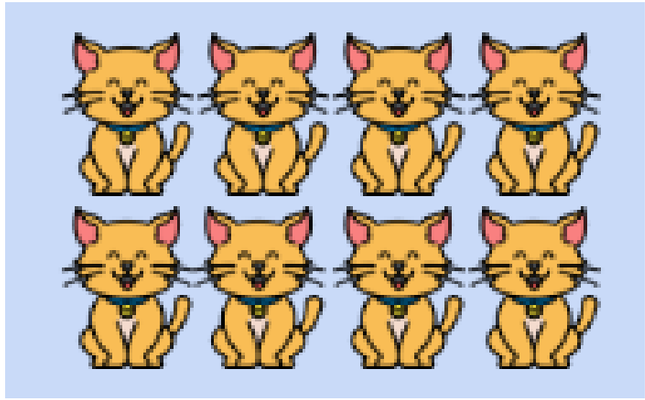
Relating Fraction and Ratio

A **Ratio** is a method used to compare **two or more quantities** with the same units. These quantities can either be distinct entities or different parts of a whole. The ratio of a to b can be expressed in three ways: as words, using a colon, or in fraction form. It is crucial to maintain the correct order when writing a ratio, as it should match the order of the items being compared. In a ratio, a part can also be compared to the whole.

Example 1:

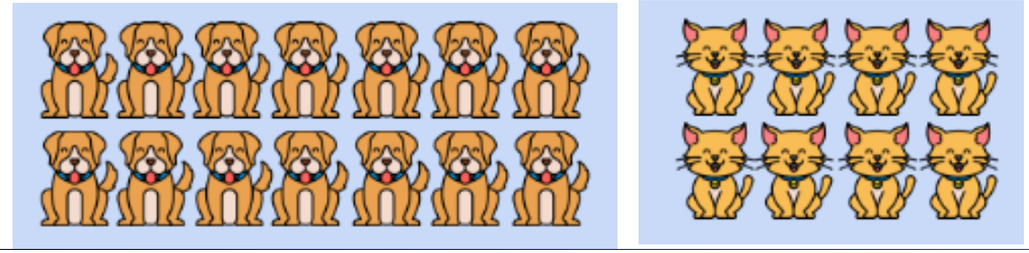
Compare the number of dog to cat





Example 1:

Compare the number of dog to cat



RATIO OF DOG TO CAT

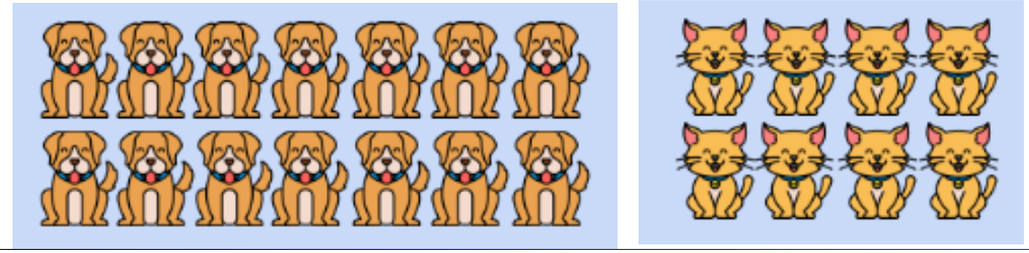
Word form - 14 is to 8

Colon form - 14:8

Fraction form - $\frac{14}{8}$

Example 1:

Compare the number of dog to cat



RATIO OF CAT TO DOG

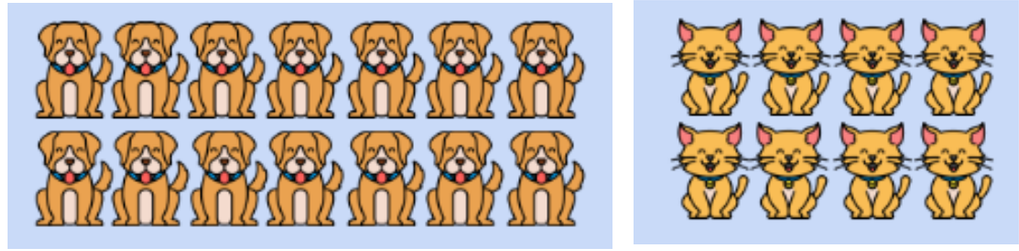
Word form - 8 is to 14

Colon form - 8:14

Fraction form - $\frac{8}{14}$

Example 1:

Compare the number of dog to cat



When you compare a part to the total number of animals, the ratio of the part to the whole has the same meaning as a fraction.

Example 2:

Compare the total number of animals to the number of cats.

RATIO OF TOTAL ANIMALS TO CATS

Word form - 22 is to 8

Colon form - 22:8

Fraction form - $\frac{22}{8}$

RATIO OF CATS TO TOTAL ANIMALS

Word form - 8 is to 22

Colon form - 8:22

Fraction form - $\frac{8}{22}$

Even when a ratio is written in fraction form, you would still say **"twenty two is to eight"** or **"eight is to twenty two."** Just like fractions, ratios should be simplified to their lowest terms. You can express the example above as:

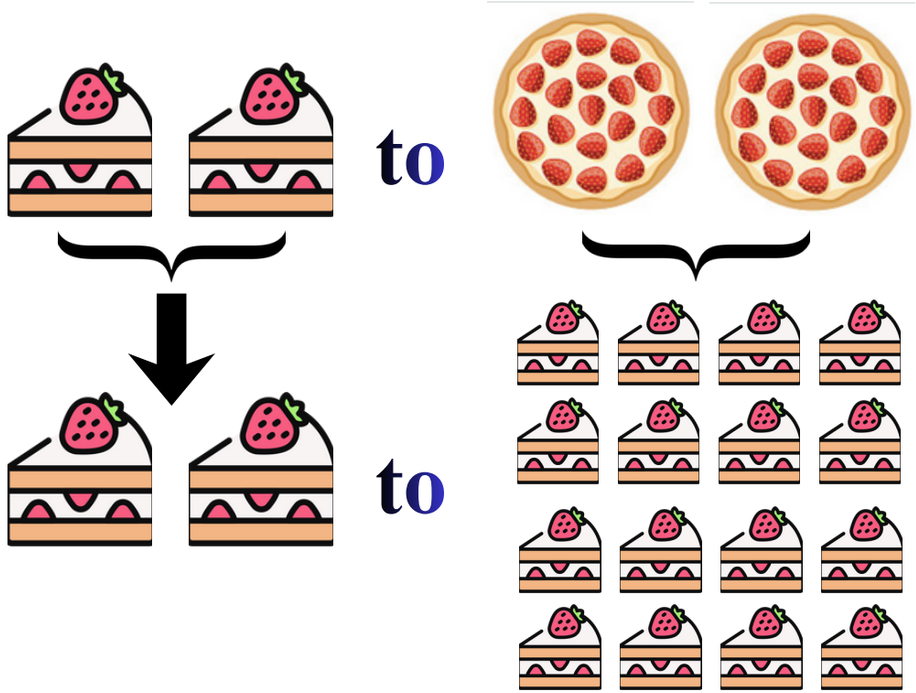
$$\frac{22}{8} = \frac{\cancel{2} \times 11}{\cancel{2} \times 4} = \frac{11}{4}$$

$$\frac{22}{8} = \frac{\cancel{2} \times 4}{\cancel{2} \times 11} = \frac{4}{11}$$

Simplest form is $\frac{11}{4} and \frac{4}{11}$

Example 3:

Express the ratio of 2 pcs of one fourth cake to 2 pcs of whole cake in colon form.



Since the two quantities have different units, you need to make sure that they must be in the same units to express the right ratio.

Thus in this example you can express ratio of the 2 quantities as 2:16, since there are 8 one-fourth piece of cake in each one whole cake.

In the simplest form, the ratio of 2 one-fourth slice of cake to 2 pcs of whole cake is **1 is to 8 or 1:8**

Example 4:

Express the equivalent ratio of $\frac{3}{6}$

$$\frac{3 \times 2}{6 \times 2} = \frac{6}{12} \qquad \frac{3 \times 3}{6 \times 3} = \frac{9}{18}$$

$$\frac{3 \times 4}{6 \times 4} = \frac{12}{24} \qquad \frac{3 \times 5}{6 \times 5} = \frac{15}{30}$$

Possible equivalent ratios for **3:6** include **6:12, 9:18, 12:24**, and **15:30**. However, sometimes the terms in a ratio have different units or classifications. This type of ratio is called a **rate**. For example, comparing kilometers to hours.

A **ratio** compares two quantities and can be written in three forms: using a colon, in words, or as a fraction.

A **rate** is a comparison between two quantities that may have different units of measurement, and the resulting ratio includes a unit of measure.