

# Ratio



## Ratio

A **ratio** is a way of dividing or splitting quantities. Although ratios can be represented as a fraction we often use a colon (:) to separate the different quantities in a ratio.

A ratio of 2 : 3 means that for every 2 units of the first quantity we use 3 units of the second quantity. Therefore if we have a ratio of 2 : 3 it is exactly the same ratio as 4 : 6 or 10 : 15.

Ratios can be simplified if we can find a common factor that divides into all the quantities.

The ratio 10 : 15 can be simplified by dividing through by the common factor of 5 giving the ratio 2 : 3.

The units for ratios should always be the same. If we are mixing liquid in the ratio 1 : 5 it does not matter if it is 1 mL to 5 mL or 1 L to 5 L.

We can also divide a quantity into a given ratio.

Consider: Split \$24 into the ratio 3 : 5

We begin by adding the 3 and 5 to get 8 parts.

Therefore the \$24 is to be split into  $\frac{3}{8}$  and  $\frac{5}{8}$ .

$$\text{So } \$24 \times \frac{3}{8} = \$9$$

$$\text{and } \$24 \times \frac{5}{8} = \$15$$

One person receives \$9 and the other person \$15.



Ratios are meant to simplify problems, so we don't usually have any decimals in a ratio and the ratio is expressed in its simplest form.



Always check that the final quantities total the original amount.

In this case  $\$9 + \$15 = \$24$ .



## Example

Simplify the ratios.

a) 18 : 30

b) 100mL : 3L Give your answer with the same units.



a) We identify the highest common factor of 6 and divide both 18 and 30 by 6.

$$18 : 30 = 3 : 5$$

Alternatively we can simplify using our calculator by entering the ratio as a fraction, i.e.

Casio 9750



TI-84 Plus



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Therefore 18 : 30 simplifies to 3 : 5

b) We convert to the same units (mL)

i.e. 100 : 3000.

We then divide by the highest common factor of 100 and 3000 which is 100 to get the simplified ratio 1 : 30.