

Simplifying Ratios

A ratio is a comparison between two numbers or two quantities with the same unit.
A ratio 3:5 means that for every 3 of the one, there are 5 of the other.

For example: Write the ratio of 24:36 in simplest form.

Solution:

The Highest Common Factor (HCF) is 12.

24:36

$$= \frac{24}{12} : \frac{36}{12}$$

$$= 2 : 3$$

We use ratios to show how many times more, or less, one quantity is than another.



Now try it yourself. Answer and show all the calculations in your exercise book.

1 Give each of these ratios in simplest form

a) 60 : 80 $3 : 4$

b) 4 : 6 $2 : 3$

c) 15 : 5 $3 : 1$

d) 16 : 20 $4 : 5$

e) 100 : 20 $5 : 1$

f) 5 : 40 $1 : 8$

g) 75 : 25 $3 : 1$

h) 12 : 2 $6 : 1$

i) 7 : 21 $1 : 3$

j) 12 : 8 $3 : 2$

k) 150 : 200 $3 : 4$

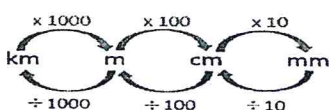
l) 27 : 30 $9 : 10$

2 In an orchard of 100 trees there are only cherry trees and plum trees

a If there are 30 plum trees what is the ratio of cherry trees and plum trees

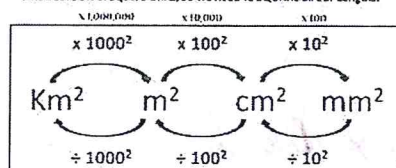
b If there are 75 cherry trees what is the ratio of plum trees to the number of trees in the orchard

Converting Metric Lengths



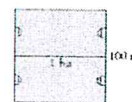
Converting AREA Units

AREA consists of Square Units, so we need to SQUARE all our Lengths.



Measuring Large Areas

- 1 hectare is about the size of 2 football fields
- 1 hectare = (100×100) m²
- 1 ha = 10 000 m²
- 1 square kilometre is a square 1km by 1km



3 Express each of the following ratios in its simplest form. First express both quantities in the same unit

a) 50 cm : 1 metre $1 : 2$

b) 800 cm² : 1 square metre $800 \text{ cm}^2 : 10000 \text{ cm}^2$

c) 200 kg : 1 tonne $200 \text{ kg} : 1000 \text{ kg}$
 $1 : 5$

d) 7500 g : 2 kilograms $7500 \text{ g} : 2000 \text{ g}$
 $2 : 25$

e) 3500 m : 5 kilometres $3500 \text{ m} : 5000 \text{ m}$
 $7 : 10$

f) 250 mL : 2 litres $250 \text{ mL} : 2000 \text{ mL}$
 $1 : 8$

g) 10 h : 1 day $10 \text{ h} : 24 \text{ h}$
 $5 : 12$

h) 3 mm : 3 metres $3 \text{ mm} : 3000 \text{ mm}$
 $1 : 1000$

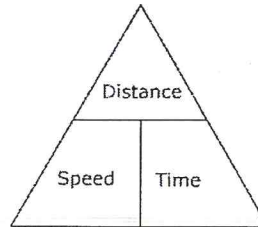
i) 8000 m² : 1 hectare $8000 \text{ m}^2 : 10000 \text{ m}^2$

j) 30 years : 1 century $30 \text{ yrs} : 100 \text{ yrs}$
 $3 : 10$

Speed, Distance and Time Worksheet

Distance Speed Time Formula

Speed is a measure of how quickly an object moves from one place to another. It is equal to the distance traveled divided by the time. It is possible to find any of these three values using the other two. This picture is helpful:



The positions of the words in the triangle show where they need to go in the equations. To find the speed, distance is over time in the triangle, so speed is distance divided by time. To find distance, speed is beside time, so distance is speed multiplied by time.

$$\text{speed} = \frac{\text{distance}}{\text{time}}, \text{time} = \frac{\text{distance}}{\text{speed}}, \text{distance} = \text{speed} \times \text{time}$$

Example:

A car is travelling at a constant speed of 80kmph. How many kilometres will the car cover if it keeps this speed for the next 3 hours and 15 minutes?

This time you need to work out the distance so $D = S \times T$

Be careful with the time as it needs to be rewritten in hours only. 15 minutes is $\frac{1}{4}$ hour (0.25) so 3 hours and 15 minutes is 3.25 hours.

Now substitute $S = 80$ and $T = 3.25$ into the formula for distance:

$$\begin{aligned} D &= S \times T \\ &= 80 \times 3.25 \\ &= 260\text{km} \end{aligned}$$

So the car travels 260km in 3 hours and 15 minutes.



Now try it yourself. Answer and show all the calculations in your exercise book.

1. A car covers a distance of 150 miles in $2\frac{1}{2}$ hours. Calculate the average speed of the car in miles per hour.
 $S = \frac{d}{T} = \frac{150\text{mi}}{2.5\text{h}} = 60\text{mph}$
2. A dog runs from one side of a park to the other. The park is 80 meters across. The dog takes 16 seconds to cross the park. What is the speed of the dog?
 $S = \frac{d}{T} = \frac{80\text{m}}{16\text{s}} = 5\text{m/s}$
3. A golf cart is driven at its top speed of 27 km/h for 10 minutes. In meters, how far did the golf cart travel?
 $d = S \times T = 27\text{km/h} \times \frac{10}{60}\text{h} = 4.5\text{km}$
4. Julia travels in an airplane a distance of 3540km. For one-third of the distance, the airplane flies at a speed of 720km/h, and for the rest of the distance, it flies at a speed of 800km/h. How long does the trip take?
 $T = T_1 + T_2$
 $T_1 = \frac{d_1}{S_1} = \frac{1180\text{km}}{720\text{km/h}} = 1.638\text{h}$
 $T_2 = \frac{d_2}{S_2} = \frac{2360\text{km}}{800\text{km/h}} = 2.975\text{h}$
 $T = 1.638\text{h} + 2.975\text{h} = 4.613\text{h}$
5. A train travels with a constant speed of 112km/h. How long will it take to travel a distance of 336 km?
 $T = \frac{d}{S} = \frac{336\text{km}}{112\text{km/h}} = 3\text{h}$
6. Cindy rides her bike with a constant speed of 16km/h. How far can she travel in 60 minutes?
 $\therefore 60\text{min} = 1\text{h}$

$$\begin{aligned} d &= S \times T \\ &= 16\text{km/h} \times 1\text{h} \\ &= 16\text{km} \end{aligned}$$

$\therefore$ Cindy can travel 16km.

