

Ratios

A ratio is basically a way to compare amounts of something. You will often see questions using ratios to calculate ingredients for a food recipe or to divide up an amount of money. For example, if I divide £150 in the ratio 2 : 1 then we split it into £100 and £50. As we've broken the £150 down into 2 parts (£100) and 1 part (£50), then there are 3 parts (2 + 1) altogether.

Ratios are similar to fractions in that both sides of the ratio can be simplified by finding common factors. **Remember** to try and divide by the highest common factor to simplify ratios quickly. Let's look at an example...

Worked example 1

A bag of marbles contains 12 blue and 16 red marbles. What is the ratio of blue to red marbles? Give your answer in its simplest form.

12 : 16



Step 1: The first step is simple – just write both numbers as a ratio.

= 3 : 4



Step 2: Then look for the largest common factor – in this case 4. Divide both sides by the common factor and you have your ratio in the simplest form.

Simplifying ratios

These ratios also **need to be expressed in whole numbers**. If you are given a ratio that is a decimal or a fraction, you need to multiply both sides by a number that will give you two whole numbers.

Worked example 2

Write the ratio 0.5 : 1 in its simplest form.

0.5 : 1



Step 1: Multiply both sides by 10 to remove the decimal

5 : 10

= 1 : 2



Step 2: Then look for a common factor – in this case 5. Divide both sides by the common factor and you have your ratio in the simplest form.

Dividing amounts into a given ratio

You also need to be able to divide numbers into a given ratio. Once you get the hang of this it is fairly straightforward. You need to add up both sides of the ratio to get the total **number of parts** in your ratio. Divide by this total to give you what one part is, and then multiply that by each side of the ratio (as in the example below).

Worked example 3:

The ratio of girls to boys in a school is 4 : 3. If there are 140 pupils in total, how many girls are there at the school?

$$4 + 3 = 7$$



Add up both sides of your ratio to give you the total number of parts.

$$140 / 7 = 20$$



Divide your total number of pupils by the total number of parts to find how many pupils "make up" one part

$$4 \times 20 = 80$$



Multiply the number of pupils in one part by the ratio of girls.

Ratios introduction – practice questions

- Express the following ratios in their simplest form:
 - 12 : 20
 - 50 : 10
 - 4 : 6
 - 240 : 330
 - $\frac{1}{4} : \frac{3}{4}$
 - 3.6 : 0.6
 - 3 : 12 : 18
 - 0.2 : 1.2 : 0.6
- Divide each amount of money in the ratio given:
 - £6 in the ratio 1 : 1
 - £15 in the ratio 2 : 3
 - £27 in the ratio 4 : 5
 - £100 in the ratio 4 : 1
 - £24 in the ratio 1 : 7
- Jim and Louise divide up a box sweets between them in the ratios of their ages. Jim is 8 and Louise is 12. If there are 100 sweets in each box, how many do they each get?
- Bob is making some fruit punch from apple juice, orange juice and lemonade in the ratio 2 : 3 : 7. Bob uses 4 litres of apple juice.
 - How many litres of orange juice and lemonade does he need?
 - How much fruit punch does he make in total?