

# Functional Skills Maths

## Level 1

Solve simple problems involving ratio, where one number is a multiple of the other.

v1.0

**Functional Skills Maths:**

Level 1

**Skill Standard:**

5

**Coverage and Range:**

Solve simple problems involving ratio, where one number is a multiple of the other.

- Understand simple ratio as the number of parts, for example three parts to one part. A drink is made from juice and water in the ratio of 1:5. How many litres of drink can I make from 2 litres of juice?
- Understand direct proportion as the same rate of increase or decrease, for example double, half, scale up amounts of food for three times the number of people, put items in piles with twice as many items in one pile as in the other.
- Know how to use a simple scale to estimate distance on a road map.<sup>1</sup>

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<sup>1</sup> QCA Functional Skills guidance: amplification of the standards June 2008 QCA/08/3700

## Explain the Skill

### Ratio

One way of comparing things is to write them as a ratio.

A ratio compares one amount with another.

A ratio is written by using a colon (:) between each amount, for example: 4:1

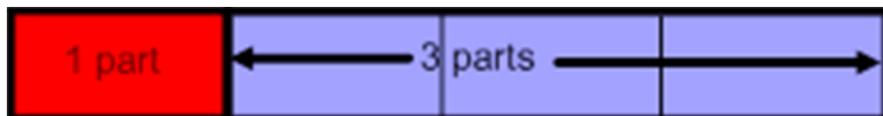
A ratio does not have any units associated with it.

### Consider the following 2 examples:

1. Pink paint is made by mixing 1 measure of white paint to 3 equal measures of red paint.
2. At a table in a restaurant there is 1 male customer and 3 female customers.

Both these examples can be represented by the ratio 1: 3.

The ratio 1: 3 is read as **1** (part of something) **to** 3 (parts of something else).



In the paint example we could mix 1 litre of white paint with 3 litres of red paint, or 1 pint of white paint with 3 pints of red paint.

### Simplifying Ratios

To simplify a ratio, divide both sides by the same number.

A ratio is normally given in its **simplest form**, this means dividing the numbers of the ratio by their highest common factor.

If we multiply or divide all numbers in a ratio by the same amount, the ratio is still in proportion and is the same ratio.

### Example

If a gardening group comprises of 20 females and 10 males, we could say that the ratio of females to males was 20:10. We can simply this ratio in to 2:1.

**Practise the Skill**

- 1) William's friends have the following pets.

18	dogs
4	guinea pigs
1	snake
14	cats
5	rabbits

- a) What is the ratio of dogs to cats to guinea pigs?

	:		:	
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William says the ratio of guinea pigs to rabbits is:

5	:	4
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- b) Is he correct? Circle your answer.

Yes / No

- 2) The ratio of the results of the local football team games won, drawn and lost is:  
18:6:24

Simplify this ratio.

\_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_

- 3) Connor has £36 and Joshua has £48. What is the ratio of Connor's money to Joshua's in its simplest form?

\_\_\_\_\_ : \_\_\_\_\_

- 4) A recipe for cookies uses 220 grams of butter, 110 grams castor sugar and 275 grams of flour. What is the ratio of sugar to flour to butter in its simplest form?

\_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_

- 5) How much castor sugar would be needed if you were scaling up the recipe and using 660 grams of butter and 825 grams of flour?

\_\_\_\_\_ g

## Explain the Skill

### Direct Proportion

If two quantities increase or decrease but the ratio between them remains the same, then the quantities are said to be in **direct proportion** to each other.

### Example

Seals and their cubs are fed in the ratio of 3:1. This means, for every 3 fish given to the mother, the cub will be fed 1 fish. So, if the cub was fed 2 fish, the mother will be fed 6 fish.

This increase is in **direct proportion**, both amounts were doubled; therefore this is still the same ratio.

## Practise the Skill

1) To build a wall a bricklayer has to mix sand and cement in the ratio 4:1.

a) How many shovels of sand would he need for two shovels of cement?

\_\_\_\_\_

b) How many shovels of cement would he need for ten shovels of sand?

\_\_\_\_\_

2) In a housing estate the direct proportion of flats to houses is 2:5. If there are 80 flats, how many houses are there?

\_\_\_\_\_

- 3) Alan grows tomatoes in his greenhouse. He uses a liquid fertiliser to help increase his yield. The instructions on the fertiliser states, “Dilute 2 capfuls of fertiliser into a watering can containing 5 litres of water”.

a) How much fertiliser does he need for 10 litres of water?

b) How much water does he need for 6 capfuls of fertiliser?

\_\_\_\_\_

\_\_\_\_\_

- 4) Anthony’s pay is directly proportional to the number of newspapers he delivers; he received £15.60 to deliver 400 newspapers.

How much will he be paid to deliver 700 papers?

£ \_\_\_\_\_

- 5) a) How much water do you need to mix with 200 ml of shampoo?

\_\_\_\_\_ ml

- b) How much water should you mix with 500 ml of shampoo?

\_\_\_\_\_ ml

- c) If the correct amount of water is mixed with 400 ml of shampoo will the mixture fit in a 2500 ml container?

**Circle your answer.**

Yes / No



## Explain the Skill

### Sharing an Amount in a Ratio

You can share an amount by finding the value of one part. When you have found out how much one part is, you will be able to work out by using the ratio, the value of the other parts.

### Example

9 pens cost £3.60. George and Patricia will share the pens in the ratio of 4:5.

How much will each of them pay?

First, we need to work out the cost of 1 pen.

$$£3.60 \div 9 = £0.40 \text{ (40p)}$$

Now we can work out how much George and Patricia have to pay using the ratio 4:5.

George will pay  $4 \times 40\text{p} = £1.60$

Patricia will pay  $5 \times 40\text{p} = £2.00$

To check you have calculated corrected add both amounts together.

£1.60 plus £2.00 is £3.60

**Practise the Skill**

- 1) Divide the following quantities in the given ratios:

$$£100 \quad 1 : 3$$

$$= £ \quad : £ \quad$$

$$£80 \quad 3 : 5$$

$$= £ \quad : £ \quad$$

$$£250 \quad 2 : 3 : 5$$

$$= £ \quad : £ \quad : £ \quad$$

Remember to check your answers by adding.

- 2) Michelle and Jasmine inherit a sum of £6000. This amount is to be shared in the ratio 3:2. How much do they each receive?

\_\_\_\_\_ : \_\_\_\_\_

- 3) Six theatre tickets cost £39.00. I want to take a group of 9 people to the theatre how much will they pay in total for the tickets?

£ \_\_\_\_\_

- 4) A car travels 30 miles in 50 minutes. How far will it travel in 1 hour?

\_\_\_\_\_ miles

- 5) The three angles of a triangle add up to  $180^\circ$ . In a particular triangle the angles are in the ratio 1: 2: 3, what are the sizes of the three angles?

\_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_

## Explain the Skill

### Scale

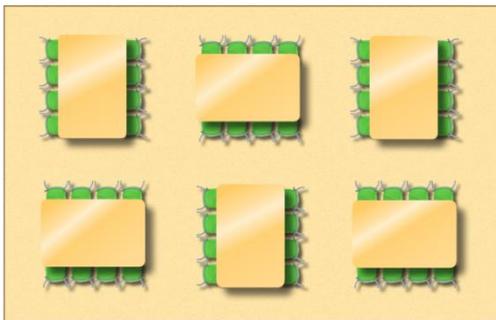
Maps, drawings and plans all use scales. It is important to ensure that the scale given allows viewers to calculate the real dimensions.

A scale given as a ratio has no dimensions associated with it.



A map could have the scale 1:100000

This could mean that 1 cm on the map equals 1 kilometre on the ground.



**Scale: 1: 200**

To work out the actual length of the function room you must first measure the length on the plan. The length on the plan is 7 centimetres.

### Calculate to find the actual length:

Multiply the length by the scale.

$$7 \times 200 \text{ cm} = 1400 \text{ cm}$$

Divide by 100 to find the length in metres.

$$1400 \div 100 = 14 \text{ metres}$$

Actual length of the Function room = 14 metres

**Practice the Skill**

- 1) If a scale is given as 1:500

What distance would be represented by:

$$4 \text{ cm} = \underline{\hspace{2cm}} \text{ m}$$

$$2 \text{ m} = \underline{\hspace{2cm}} \text{ m}$$

$$8.5 \text{ km} = \underline{\hspace{2cm}} \text{ km}$$

- 2) On a scale drawing, a footpath around the allotment is 24 cm long. The scale on the drawing is 1:30.

What is the actual length of the footpath?

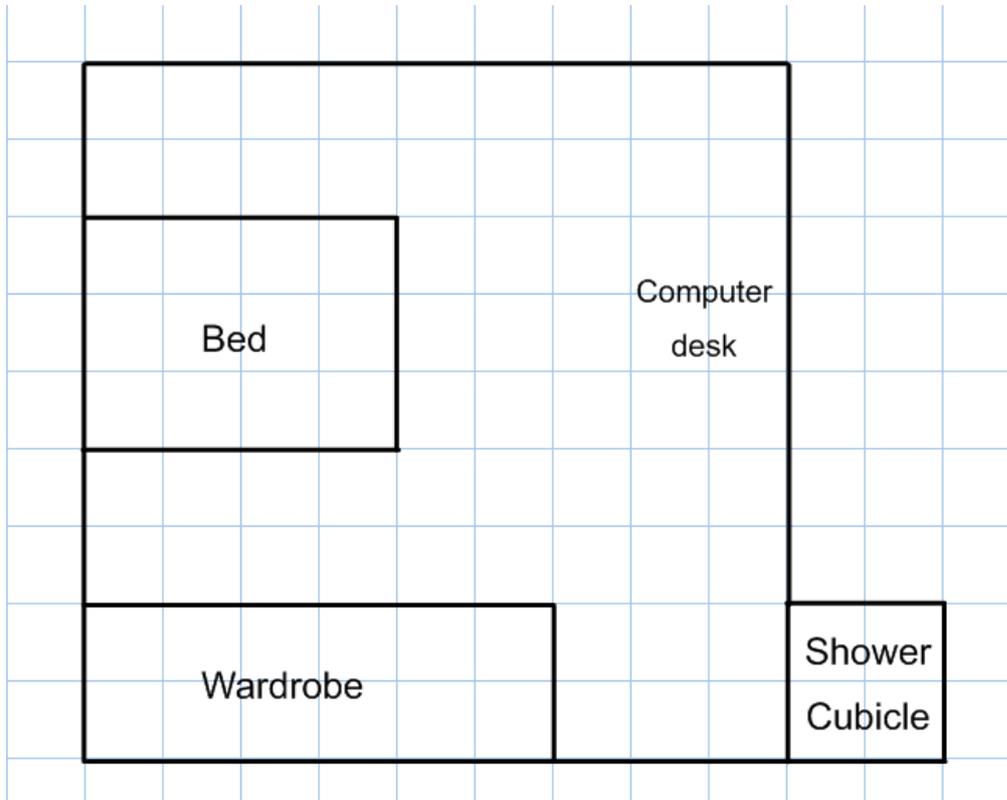
                     metres

- 3) Gerry and Claire have been out walking using a map with a scale of 2 cm: 1 km. The distance they have walked on the map is 14 cm.

How far have they actually walked?

                     km

- 4) Mario has drawn a plan of his bedroom on 1 cm square paper:



- a) His en-suite shower cubicle measures 1 m x 1 m, give the scale of his drawing as a ratio.

\_\_\_\_\_ : \_\_\_\_\_

- b) What are the actual dimensions of his bed?

\_\_\_\_\_ m x \_\_\_\_\_ m

- c) His wardrobe is actually 3.5 m x 1 m has he drawn it correctly on the plan?

Yes / No

- d) He has a computer desk which is positioned on the wall opposite his bed, it is 1.5 m in length and 1 m wide, what dimensions should he use on his plan for the desk?

\_\_\_\_\_ x \_\_\_\_\_ (length x width)

**Apply the Skill**

- 1) Andrew and Connie are both teachers at their local school. There are 15 female teachers at the school and 35 male teachers.

What is the ratio of male to female teachers?

- 2) In Andrew's evening class there are 20 people. \_\_\_\_\_ : \_\_\_\_\_

<b><i>12 are male</i></b> <b><i>5 wear spectacles</i></b> <b><i>5 are left handed</i></b>	<b><i>8 are female</i></b> <b><i>15 do not wear spectacles</i></b> <b><i>15 are right handed</i></b>
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Using the information given, complete the following, remembering to give your answer in its simplest form:

- a) The ratio of right handed: left handed is

\_\_\_\_\_ : \_\_\_\_\_

- b) The ratio of male: female is

\_\_\_\_\_ : \_\_\_\_\_

- 3) At the school the ratio of boys to girls is 5:3. If there are 385 boys in the school, how many students are there altogether?

\_\_\_\_\_

- 4) At the parents evening the ratio of Mums to Dads was 3:2. Out of 500 appointments how many were with mums?

\_\_\_\_\_

- 5) Connie runs the after school cookery club.

The group will be baking scones this week and doubling up the following recipe.

**Recipe for 12 scones:**

250 g self-raising flour  
60 g butter  
30 g caster sugar  
175 ml milk

- a) How much castor sugar is to be used?

\_\_\_\_\_ g

- b) What is the ratio of caster sugar to butter?

\_\_\_\_\_ : \_\_\_\_\_

- 6) 81 passed and 27 failed their Functional Skills Level 2 exam.

Write this as a ratio.

\_\_\_\_\_

- 7) The ratio for the pass to fail results of a Functional Skills Level 1 exam is 7:2.

If 12 learners failed, how many passed?

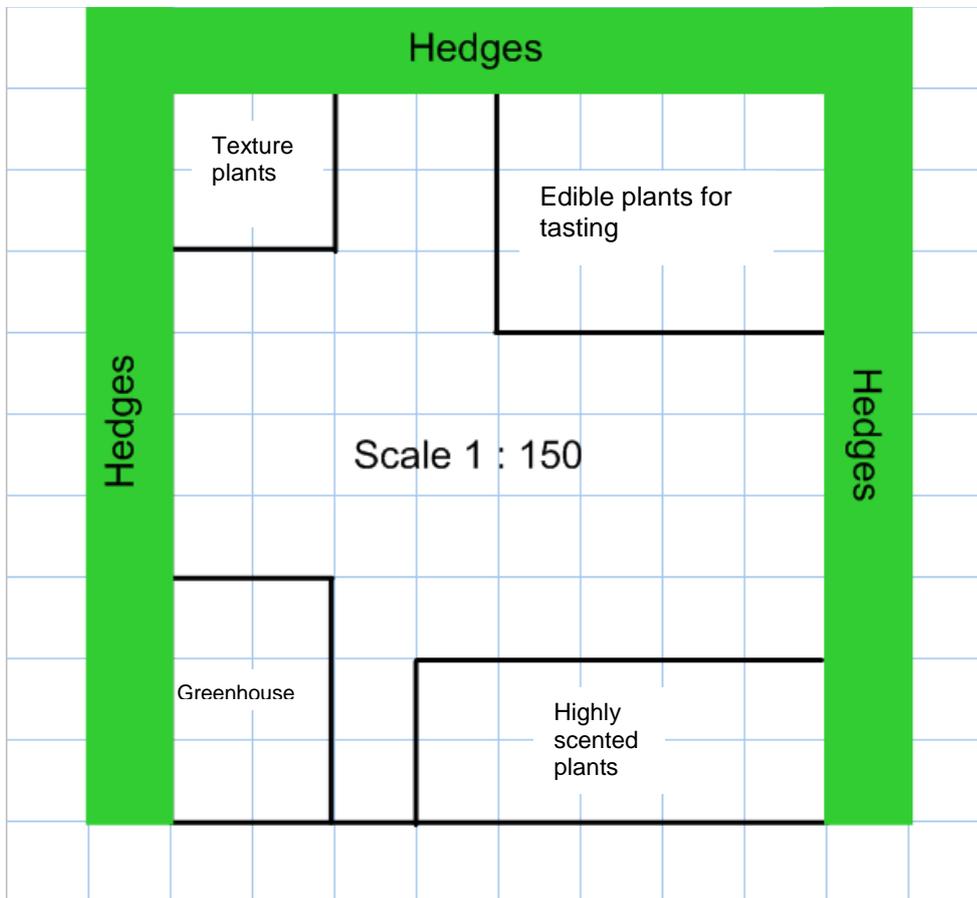
\_\_\_\_\_

- 8) Andrew is working out how much he has recently been spending on sandwiches. Last month Andrew bought 25 BLT sandwiches costing £51.25. This month he has bought 16.

How much has Andrew spent on BLT sandwiches this month?

£ \_\_\_\_\_

- 9) This is the plan of the sensory garden at the school. It is drawn on 1 cm squared paper.



- a) What are the actual dimensions of the greenhouse?

\_\_\_\_\_ m x \_\_\_\_\_ m

The school have received a donation and they have decided to add a rectangular water feature to the garden.

The water feature must be 75 cm away from the hedge, the edible plants bed and the highly scented plants.

- b) The water feature has dimensions 4 m x 6 m, will it fit?

**Circle your answer.**

Yes / No