

Ratio and Proportion

- 1) A school has a total of 950 pupils. 400 pupils are boys and the rest are girls.
Complete the line below to show the ratio of the number of boys to the number of girls

Boys : Girls

.... :

- 2) In a competition there are 3 prize winners, 1st, 2nd and 3rd. The organisers have £60 to spend on the prizes. They decide to split the money up in the ratio 3:2:1. The 1st gets the most expensive prize and the 3rd gets the least expensive prize. How much money is spent on each prize?

- 3) A length of wood is cut into two smaller lengths in the ratio 3:2.
The smaller length is 60cm long.

- a) How long is the larger length?
b) What was the length of the original piece of wood?

- 4) Two local primary schools join forces to have a school fair. There are 300 pupils in the first school and 400 in the second. They decide to share the proceeds in the same ratio as the number of pupils in each school.

- a) Which school gets the most money?
b) Complete this statement for the ratio of pupils at the schools.

school 1 : school 2

= 300 : 400

= 3 :

- c) They make a profit of £350. How much money does each school get?

- 5) Miranda carries out a survey. She counts the different vehicles passing her school over a period of one hour in the morning. The numbers of vehicles she counted were
15 Buses, 60 Vans, 75 Lorries and 150 Cars.

- a) Complete this line to show the ratio of the number of vehicles.

Buses : Vans : Lorries : Cars

1 : : :

In the afternoon, she carries out another survey. This time the ratio of vehicles was

Buses : Vans : Lorries : Cars

1 : 3 : 5 : 7

- b) Altogether 320 vehicles passed her in the afternoon. How many were vans?

Ratios

- 1) Ewan has to do a survey of the trees in a plantation. He counts them and these are his results

Oak 15, Ash 45, Beech 60 and Horse Chestnut 90

He writes these down as ratios

Oak	Ash	Beech	Horse Chestnut
1

- a) Complete the line of ratios.

Ewan cuts down 10 Oak, 15 Ash, 25 Beech and 35 Horse Chestnut trees.

- b) Complete the new line of ratios.

Oak	Ash	Beech	Horse Chestnut
1

- c) What percentage of the trees are now Beech?

- 2) Duncan works in a kiosk selling drinks, ice cream and sweets. On a warm day in June he finds that 60% of his sales are for drinks, 25% are for ice cream and the rest are for sweets.

- a) Complete the ratios below

Sweets : Ice Cream : Drinks
3 : :

The next day is colder. He finds that his sales of drinks are down by $\frac{3}{4}$, his sales of ice cream are down by $\frac{1}{5}$ and his sales of sweets remain the same.

- b) Complete this ratio line for the second day.

Sweets : Ice Cream : Drinks
3 : :

- c) What percentage of his sales on the second day are for drinks?

- 3) Sally carries out a survey. She counts the different vehicles that pass her school during half an hour in the morning. These were her results.

50 cars, 20 lorries, 10 vans and 5 buses.

- a) Complete the line below to show the ratio.

Buses : Vans : lorries : Cars
1 : : :

She does a second survey in the afternoon. This time the number of buses remains the same, the number of vans increase by 50%, the number of lorries decrease by 50% and the number of cars increase by 30%

- b) What is the total number of vehicles passing Sally over the second period?

- c) Complete this line to show the ratios for the second survey.

Buses : Vans : lorries : Cars
1 : : :

Ratio 1

1) The table below shows some information about the 6th form students of a school.

	Can speak French	Can't speak French
Boys	23	81
Girls	34	72

- a) How many pupils are there in the 6th form?
b) What is the ratio of those who can speak French to those who can't?

1 :

2) The scale on a map is 1 : 25,000.

This indicates that an actual distance of 25,000 centimetres (250 metres) is represented by 1 centimetre on the map.

- a) What distance on the map will represent an actual distance of 1 kilometre?
b) A road measures 5.6cm on the map. What is its actual length?
c) Gwyn walks a distance of 8.7km along the side of the canal. Approximately how long is this on the map?

3) Below are shown the areas of the parts of the British Isles. (The Isle of Man and the Channel Islands have been left out)

Country	Area in square kilometres
Wales	20,761
Ireland	70,285
Scotland	78,772
England	130,360

Complete this ratio for the four countries which shows their relative sizes.

Wales : Ireland : Scotland : England

1 : : :

4) Four cubes, each of exactly the same size (congruent), are made from four different metals. The ratio of their masses is shown below.

Aluminium : Titanium : Copper : Lead
1 : 1.67 : 3.31 : 4.2

- a) If the aluminium cube has a mass of 0.7kg, what are the masses of the other cubes?
b) Another bigger shape is made. Again exactly the same size for each of the materials.
If the titanium shape has a mass of 4.5kg, what is the mass of the copper shape?

Ratio 2

1) Halla mixes paint. She wants to make pale green. These are the colours she uses.

135ml of blue
120ml of yellow
45ml of white.

a) How much of each colour is in 100ml of the mixture?

Winston mixes paint to get a pale green. These are the colours he uses

115ml of blue
105ml of yellow
30ml of white.

b) How much of each colour is in 100ml of the mixture?

c) Which of the two mixtures is the paler?

2) A biscuit bar has the following information printed on the side of its packet.

TYPICAL NUTRITION	PER 45g BAR	PER 100g
Energy	824kj/197kC	a
Protein	b	8.4g
Carbohydrate	26.7g	59.2g
Fat	9.3g	c
Fibre	d	7.3g
Sodium	0.03g	0.06g

Complete the table by putting in the values a, b, c and d.

3) Bridget buys a longlife bulb. It costs £5. The packet has the following information printed on the side.

A longlife bulb uses 15 watts of electricity per hour and lasts for 8,000 hours.

An ordinary bulb uses 75 watts per hour and lasts for 1,000 hours.

a) How many watts of electricity does a longlife bulb use in its lifetime?

b) How many watts of electricity does a normal bulb use in its lifetime?

c) Complete this ratio for the amount of electricity used by each type of bulb in 8,000 hours.

Longlife bulb : Ordinary bulb

1 : ...

d) An ordinary bulb costs 25p. Complete this ratio for the cost of the bulbs for 8,000 hours.

Longlife bulb : Ordinary bulb

... : 1

e) Is it economical to buy a longlife bulb in preference to an ordinary one? Explain your answer.

Scale Drawings and Ratio

Do not use a calculator

Exercise 1

Fill in the missing values for each of the following

Scale	Dimensions on Drawings	Actual Dimensions
1:4	10cm	
1:5		40cm
1:10	6.2cm	
1:20		140cm
1:40	10cm	
1:8		1.28cm
	20cm	6 metres
	15cm	3 metres
1:50		2.5 metres
1:100	2.5cm	
	2.5cm	5 metres
	7cm	17.5cm
1:500		27.5m
1:75	6cm	
	15cm	4.5m
1:12		138cm
1:250	3.6cm	
	4.5cm	22.5cm
1:75		600cm
1:40	2.6cm	

Exercise 2

Divide each of the following into the ratios given.

- 1) £900 into the ratio 4:5
- 2) £1000 into the ratio 3:7
- 3) £200 into the ratio 3:5
- 4) £600 into the ratio 7:8
- 5) £800 into the ratio 5:11
- 6) £700 into the ratio 5:9
- 7) £630 into the ratio 7:11
- 8) £1265 into the ratio 9:14
- 9) £2205 into the ratio 8:13
- 10) £1200 into the ratio 3:4:5
- 11) £450 into the ratio 5:6:7
- 12) £315 into the ratio 2:3:4
- 13) £1008 into the ratio 7:8:9
- 14) £1215 into the ratio 7:9:11
- 15) £550 into the ratio 5:8:9
- 16) £78.40 into the ratio 3:4:7
- 17) £150 into the ratio 6:8:11
- 18) £13.86 into the ratio 3:7:11
- 19) £864 into the ratio 4:7:13
- 20) £343 into the ratio 3:4:7

Exercise 3

Three people, A, B and C, share an amount of money in the ratios shown below.

In each case calculate the total amount of money shared out and the amount C gets.

- 1) Ratio 2:3:4. A gets £8
- 2) Ratio 3:4:5. B gets £12
- 3) Ratio 3:8:10. B gets £24
- 4) Ratio 3:5:7. A gets £33
- 5) Ratio 7:11:14. B gets £99
- 6) Ratio 3:5:11. A gets £1.65
- 7) Ratio 2:5:8. B gets £3.35
- 8) Ratio 3:6:13. B gets £6.72
- 9) Ratio 5:7:9. A gets £11.55
- 10) Ratio 4:11:13. B gets £56.10

Ratio and Proportion

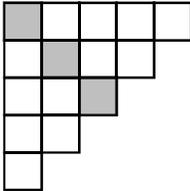
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- 4) £600 into the ratio 7:8
- 5) £1200 into the ratio 5:7
- 6) £750 into the ratio 7:3
- 7) £800 into the ratio 5:11
- 8) £700 into the ratio 5:9
- 9) £630 into the ratio 7:11
- 10) £1265 into the ratio 9:14
- 11) £2205 into the ratio 8:13
- 12) £1170 into the ratio 4:5
- 13) £120 into the ratio 7:3:2
- 14) £450 into the ratio 5:6:7
- 15) £550 into the ratio 5:8:9
- 16) £13.86 into the ratio 3:7:11

Exercise 2

- 1) Peter and Ann win £600 on the lottery. They decide to share it in the ratio 3:2.
How much will each receive?
- 2) A length of electric wire measuring 100 metres is cut into two pieces in the ratio 3:7. How long is each piece?
- 3) The ratio of squares shaded in to those not shaded in is 1:2. How many more need to be shaded to make the ratio 2:1?

- 4) Liam makes some chocolate buns. The recipe below will make 8 buns.
50 g of butter
150 ml of water
60g of flour
6 eggs
170g chocolate
 - a) Liam wants to make 12 buns. How much of each ingredient will he need?
 - b) Last week Liam's mum made 30 buns. How much of each ingredient did she use?
- 5) An amount of money was shared between two brothers in the ratio 5:4. The first brother got £200. a) How much did the second brother get? b) How much money was there altogether?
- 6) In a school there are 950 pupils. The ratio of boys to girls is 13:12. How many boys and how many girls are in the school?
- 7) A newsagent knows that for every 5 copies of a gardening magazine she sells she also sells 8 copies of a TV magazine. If she sells 100 gardening magazines, how many TV magazines does she sell?
- 8) The ratio of shaded squares to unshaded squares in this diagram is 1:4. How many more squares need to be shaded to make the ratio 2:1?

- 9) 15 shortbread biscuits can be made from the following recipe
105g of butter
45g caster sugar
180g plain flour
Re-write the recipe for 25 biscuits.
- 10) An alloy is made of copper, tin and lead in the ratio 12:5:3.
Calculate how much of each metal is in 800g of the alloy.
- 11) Three friends buy 6 lottery tickets between them. Ann pays £3, Beverley pays £2 and Carol pays £1. They agree to share their winnings in the ratio of their stakes.
If they win £24,000 how much do they each get?