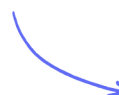


Problem Solving with Ratios

Ratios with Fractions, Decimals & Percentages / Multiple Ratios

Medium (13 questions)	/46
Hard (14 questions)	/53
Very Hard (11 questions)	/47
Total Marks	/146

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Medium Questions

- 1 In a box of pens, there are:

three times as many red pens as green pens **and** two times as many green pens as blue pens.

For the pens in the box, write down

the ratio of the number of red pens to the number of green pens to the number of blue pens.

(2 marks)

- 2 30% of the people at a concert are female.
1295 of the people at the concert are male.

Work out the number of people at the concert who are female.

(3 marks)

- 3 Colin, Dave and Emma share some money.

Colin gets $\frac{3}{10}$ of the money.

Emma and Dave share the rest of the money in the ratio 3 : 2 What is Dave's share of the money?

(4 marks)

- 4 (a)** Pavel and Katie share some sweets in the ratio 3 : 8 Katie gets 32 sweets.

How many sweets does Pavel get?

(2 marks)

- (b)** Katie also has a tin of chocolates.
There are 80 chocolates in the tin.
45% of the chocolates have toffee in the middle.

Work out the number of chocolates that have toffee in the middle.

(2 marks)

- 5** Raya buys a van for £8500 plus VAT at 20%

Raya pays a deposit for the van.

She then pays the rest of the cost in 12 equal payments of £531.25 each month.

Find the ratio of the deposit Raya pays to the total of the 12 equal payments.

Give your answer in its simplest form.

(5 marks)

6 In a village

the number of houses and the number of flats are in the ratio 7 : 4 the number of flats and the number of bungalows are in the ratio 8 : 5

There are 50 bungalows in the village.
How many houses are there in the village?

(3 marks)

7 There are some people in a cinema.

$\frac{3}{5}$ of the people in the cinema are children.

For the children in the cinema,

number of girls : number of boys = 2 : 7

There are 170 girls in the cinema.

Work out the number of adults in the cinema.

(5 marks)

8 Anna and Lionel share 675 in the ratio 4:5.

Lionel gives $\frac{3}{5}$ of his share of the money to his mother.

How much money does Lionel give to his mother?

\$.....

(3 marks)

- 9** Joe and Kyle share an amount of money in the ratio $7 : n$

Joe gets 35% of the money.

Work out the value of n .

(2 marks)

- 10** In a box of mixed nuts, the total number of almonds, cashews and peanuts is 1025.
The ratio of almonds to cashews is $1 : 3$.
The ratio of cashews to peanuts is $5 : 7$.

Calculate the number of cashews in the box.

(4 marks)

- 11** A box contains only red, blue and green pens.
The ratio of red pens to blue pens is $5 : 9$.
The ratio of blue pens to green pens is $1 : 4$.

Calculate the percentage of pens that are blue.

(4 marks)

- 12** There is a total of 250 men, women and children on a train.
The ratio of men to women is 4 : 5.
The ratio of women to children is 10 : 7.

How many men are on the train?

(4 marks)

- 13** A bag of sweets contains only mints, sherberts and toffees.

The ratio of the number of mints to sherberts is 2 : 3.
The ratio of the number of sherberts to toffees is 7 : 5.

What fraction of the sweets are sherberts?

(3 marks)

Hard Questions

- 1 Suha has a full 600 ml bottle of wallpaper remover.

She is going to mix some of the wallpaper remover with water.

Here is the information on the label of the bottle.

Wallpaper remover 600 ml Mix $\frac{1}{4}$ of the wallpaper remover with 4500 ml of water

Suha is going to use 750 ml of water.

How many millilitres of wallpaper remover should Suha use?
You must show your working.

(4 marks)

- 2 In a company, the ratio of the number of men to the number of women is 3 : 2

40% of the men are under the age of 25

10% of the women are under the age of 25

What percentage of all the people in the company are under the age of 25?

(4 marks)

- 3** Kiaria is 7 years older than Jay.
Martha is twice as old as Kiaria.
The sum of their three ages is 77

Find the ratio of Jay's age to Kiaria's age to Martha's age.

(4 marks)

- 4** There are only blue pens, green pens and red pens in a box.

The ratio of the number of blue pens to the number of green pens is 2 : 5
The ratio of the number of green pens to the number of red pens is 4 : 1

There are less than 100 pens in the box.

What is the greatest possible number of red pens in the box?

(3 marks)

5 On a farm

the number of cows and the number of sheep are in the ratio 6 : 5
the number of sheep and the number of pigs are in the ratio 2 : 1

The total number of cows, sheep and pigs on the farm is 189

How many sheep are there on the farm?

(3 marks)

6 £360 is shared between Abby, Ben, Chloe and Denesh.

The ratio of the amount Abby gets to the amount Ben gets is 2 : 7

Chloe and Denesh each get 1.5 times the amount Abby gets.

Work out the amount of money that Ben gets.

(4 marks)

7 On a farm there are chickens, ducks and pigs.

The ratio of the number of chickens to the number of ducks is 7 : 2

The ratio of the number of ducks to the number of pigs is 5 : 9 There are 36 pigs on the farm.

Work out the number of chickens on the farm.

(3 marks)

8 Pieter owns a currency conversion shop.

Last Monday, Pieter changed a total of 20160 rand into a number of different currencies.

He changed $\frac{3}{10}$ of the 20 160 rand into euros.

He changed the rest of the rands into dollars, rupees and francs in the ratios 9 : 5 : 2

Pieter changed more rands into dollars than he changed into francs.

Work out how many more.

(4 marks)

9 In a bag there are blue discs, green discs and white discs.

There are four times as many blue discs as green discs.

number of blue discs : number of white discs = 3 : 5

One disc is selected at random.

Work out the probability that the disc is either blue or white.

(3 marks)

10 $e : f = 2 : 3$ and $f : g = 5 : 4$

Work out $e : g$

Give your answer in its simplest form.

(3 marks)

11 A bag contains some counters.

- There are 300 counters in the bag.
- There are only red, white and blue counters in the bag.
- The probability of picking a blue counter is $\frac{23}{50}$
- The ratio of red counters to white counters is 2 : 1.

Calculate the number of red counters in the bag.

(4 marks)

12 In a school, $\frac{2}{3}$ of the students study a language. Of those students who study a language, $\frac{2}{5}$ study Spanish.

Find the ratio of students who study Spanish to students who do not study Spanish.

(3 marks)

13 (a) The population of a village is in the following ratios.

- men : children = 11 : 3
- women : children = 5 : 2

Find the ratio men : women. Give your answer in its simplest form.

(2 marks)

(b) There are 36 children in the village.

Find the total population of the village.

(3 marks)

14 In a village the ratio of males to females is 2:1.

40% of the people in the village are right-handed males.

25% of the people in the village are right-handed females.

Show that the proportion of females who are right-handed is greater than the proportion of males who are right-handed.

(6 marks)

Very Hard Questions

- 1 Daniel bakes 420 cakes.

He bakes only vanilla cakes, banana cakes, lemon cakes and chocolate cakes.

$\frac{2}{7}$ of the cakes are vanilla cakes.

35% of the cakes are banana cakes.

The ratio of the number of lemon cakes to the number of chocolate cakes is 4: 5

Work out the number of lemon cakes Daniel bakes.

(5 marks)

- 2 On Saturday, some adults and some children were in a theatre. The ratio of the number of adults to the number of children was 5 : 2

Each person had a seat in the Circle or had a seat in the Stalls. $\frac{3}{4}$ of the children had seats in the Stalls.

117 children had seats in the Circle.

There are exactly 2600 seats in the theatre.

On this Saturday, were there people on more than 60% of the seats?

You must show how you get your answer.

(5 marks)

- 3 White shapes and black shapes are used in a game. Some of the shapes are circles. All the other shapes are squares.

The ratio of the number of white shapes to the number of black shapes is 3 : 7

The ratio of the number of white circles to the number of white squares is 4 : 5

The ratio of the number of black circles to the number of black squares is 2 : 5

Work out what fraction of all the shapes are circles.

(4 marks)

- 4 The points A , B , C and D lie in order on a straight line.

$$AB:BD = 1:5$$

$$AC:CD = 7:11$$

Work out $AB:BC:CD$

(3 marks)

- 5 (a)** There are some small cubes and some large cubes in a bag.
The cubes are red or the cubes are yellow.

The ratio of the number of small cubes to the number of large cubes is 4: 7
The ratio of the number of red cubes to the number of yellow cubes is 3 : 5

Explain why the least possible number of cubes in the bag is 88.

(1 mark)

- (b)** All the small cubes are yellow.

Work out the least possible number of large yellow cubes in the bag.

(3 marks)

- 6** b is two thirds of c .

$$5a = 4c$$

Work out the ratio $a : b : c$

Give your answer in its simplest form where a , b and c are integers.

(3 marks)

- 7** $a : b = 9 : 4$ and $10b = 7c$

Work out $a : c$ in its simplest form.

(3 marks)

8 Arjun and Gretal each pay rent.

In 2018, the ratio of the amount each paid in rent was Arjun : Gretal = 5 : 7.

In 2019, the ratio of the amount each paid in rent was Arjun : Gretal = 9 : 13.

Arjun paid the same amount of rent in both 2018 and 2019.

Gretal paid \$290 more rent in 2019 than she did in 2018.

Work out the amount Arjun paid in rent in 2019.

\$

(4 marks)

9 Some visitors to a campsite are in the ratio

men : women = 5 : 4 and women : children = 3 : 7.

i) Calculate the ratio **men : women : children** in its simplest form.

..... : : [2]

ii) There are 224 children at the campsite.

Calculate the total number of men and women.

[3]

(5 marks)

10 The fares for a train journey are shown in the table below.

From London to Marseille	Standard fare	Premier fare
Adult	\$84	\$140
Child	\$60	\$96

For one journey from London to Marseille, the ratio

number of adults : number of children = 11 : 2.

There were 220 adults in total on this journey.

All of the children and 70% of the adults paid the standard fare. The remaining adults paid the premier fare.

Calculate the total of the fares paid by the adults and the children.

\$

(5 marks)

11 Some people who work for a company are in the following age groups.

Group A	Group B	Group C
Under 30 years	30 to 50 years	Over 50 years

The ratio of the number in group A to the number in group B is 7 : 10. The ratio of the number in group B to the number in group C is 4 : 3.

i) Find the ratio of the number in group A to the number in group C. Give your answer in its simplest form.

..... : [3]

ii) There are 45 people in group C. Find the total number of people who work for the company.

[3]

(6 marks)