Ratio Problem Solving

Questions

Q1. Colin, Dave and Emma share some money.

Colin gets $^{3}/_{10}$ 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?

Emma and Dave receive $\frac{7}{10}$ of money

5 shares = $\frac{7}{10} = \frac{35}{50}$

1 share = $\frac{7}{50}$

Dave receives $2 \times \frac{7}{50} = \frac{7}{25}$ of money

. . . . . .

(Total for Question is 4 marks)

Q2.

Each day a company posts some small letters and some large letters.

The company posts all the letters by first class post.

The tables show information about the cost of sending a small letter by first class post and the cost of sending a large letter by first class post.

Small Letter

Weight	First Class Post
0–100 g	60p

Large Letter

Weight	First Class Post
0–100 g	£1.00
101–250 g	£1.50
251–500 g	£1.70
501–750 g	£2.50

200 is 5 parts
40 is 1 part
Small : large
120 : 80
70% of 80 = 56
∴ 120 small
56 0-100 L
24 101-150 L

One day the company wants to post 200 letters.

The ratio of the number of small letters to the number of large letters is 3:2

70% of the large letters weigh 0-100 g.

The rest of the large letters weigh 101-250 g.

Work out the total cost of posting the 200 letters by first class post.

120 × 60p + 56 × 100p + 24 × 150p

= 16400p

= £164

£ 164

(Total for Question is 5 marks)

Q3.

* Seeta is organising a concert to raise money for a school and for a hospital.

A total of $\frac{1}{20}$ of the money received from selling tickets will be spent on hiring a hall.

The rest of the money received from selling tickets will be given to the school and to the hospital in the ratio 2:3

Seeta expects to sell 1000 tickets at £23.50 each.

Work out the amount of money that Seeta expects to give to the school and to the hospital.
You must show all your working.

1000 × £23.50 = £23500

Distribute 23500 × $\frac{19}{20}$ = £22325

£22325 = 5 shares

£4465 = 1 share

School 2 × £4465
= £8930

Hospital 3 × £4465
= £13395

(Total for question = 5 marks)

Q4.

5 schools sent some students to a conference.

One of the schools sent both boys and girls.
This school sent 16 boys.
The ratio of the number of boys it sent to the number of girls it sent was 1 : 2

The other 4 schools sent only girls.
Each of the 5 schools sent the same number of students.

Work out the total number of students sent to the conference by these 5 schools.

School A 16 Boys 32 Girls
B 48
C 48
D 48
E 48

16 Boys 224 Girls

Total 240 students

240

(Total for Question is 4 marks)

Q5.

A supermarket car park has 200 spaces.
10% of the spaces are for staff.

10% of 200 = 20

The other spaces are for disabled people, for parents and for other customers in the ratio 1 : 2: 7

Paul is going to paint a sign for each of the spaces for staff, for disabled people and for parents.

200 x 90% = 180

180 = 10 parts 18 = 1 part

He is **not** going to paint signs for the spaces for other customers.

Work out the total number of spaces Paul is going to paint a sign for.

disabled = 18
parents = 36
staff = 20
74

74

.....

(Total for question = 4 marks)

Q6.

* Talil is going to make some concrete mix.
He needs to mix cement, sand and gravel in the ratio 1 : 3 : 5 by weight.

Talil wants to make 180 kg of concrete mix.

9 parts = 180 kg
1 part = 20 kg

Talil has

	Requires
15 kg of cement	20 kg
85 kg of sand	60 kg
100 kg of gravel	100 kg

Does Talil have enough cement, sand and gravel to make the concrete mix?

Enough sand and gravel but not enough cement

(Total for Question is 4 marks)

Q7.

Mrs Jennings shares £770 between her two sons, Pete and Tim.

She shares the money in the ratio of her sons' ages.

The combined age of her two sons is 66 years.
Pete is 6 years younger than Tim.

Work out how much money each son gets.
You must show all your working.

let Tim be x
then Pete is $x-6$

Total ages $= x + x - 6$
$= 2x - 6$

$2x - 6 = 66$
$2x = 66 + 6$
$2x = 72$
$x = 36$

Tim Pete
36 30

66 shares = 770

Tim receives $\frac{36}{66} \times 770 = £420$

Pete receives $\frac{30}{66} \times 770 = £350$

Pete £ 350

Tim £ 420

(Total for Question is 5 marks)

Q8.

*140 children will be at a school sports day.
Lily is going to give a cup of orange drink to each of the 140 children.
She is going to put 200 millilitres of orange drink in each cup.

The orange drink is made from orange squash and water.
The orange squash and water are mixed in the ratio 1 : 9 by volume.

Orange squash is sold in bottles containing 750 millilitres.

Work out how many bottles of orange squash Lily needs to buy.
You must show all your working.

5 cups = 1 litre

$\frac{140}{5}$ = 28 litres

10 parts = 28 litres

1 part = 2.8 litres

4 x 750 ml = 3 litres

3 x 750 ml = 2.25 litres

∴ 4 bottles required

(Total for Question is 4 marks)

Q9.

$\frac{3000}{20}$ = 150 litres required

Gary's motorbike uses petrol.

Gary needs to mix oil with the petrol.
He mixes oil and petrol in the ratio 1 : 14 by volume.

15 parts = 150 litres

1 part = 10 litres

Gary is going to ride his motorbike 3000 miles.
Each 20 miles he rides uses 1 litre of the oil and petrol mixture.

500ml bottles

So 20 bottles required

A 500 ml bottle of oil costs £3.99

Work out the total cost of the bottles of oil Gary needs to buy.
(1 litre = 1000 ml)

20 x £3.99

You must show all your working.

£ 79.80

(Total for question = 4 marks)

3 parts = 60g

1 part = 20g

Q10.

Babajan makes breakfast cereal.
She mixes nuts, raisins and oats in the ratio 3 : 2 : 5 by weight.

On Monday, Babajan uses 60 grams of nuts.

(a) Work out the weight of raisins and the weight of oats she uses to make the breakfast cereal.

raisins 2x20 = 40 grams

oats 5x20 = 100 grams

(3)

On Tuesday, Babajan makes 300 grams of the breakfast cereal.

500 grams of nuts cost £8

(b) Work out the cost of the nuts used to make 300 grams of the breakfast cereal.

nuts = $\frac{3}{10}$ x 300 = 90g

£ 1.44

$\frac{90}{500}$ x 8 = 1.44

(3)

(Total for question = 6 marks)

Q11.

There are some red counters and some yellow counters in a bag in the ratio 1 : 5

(a) What fraction of the counters in the bag are red?

$\frac{1}{6}$

.....

(1)

There are 20 yellow counters in the bag.

5 parts = 20
1 part = 4

(b) Work out the number of red counters in the bag.

4

.....

(2)

Janet puts some more red counters into the bag.
The ratio of the number of red counters to the number of yellow counters is now 1 : 2

(c) How many red counters does Janet put into the bag?

Another 6 gives 10 : 20
= 1 : 2

6

.....

(2)

(Total for question = 5 marks)

Q12.

Emma has a digital photo.

540 pixels

Diagram **NOT** accurately drawn

720 pixels

The photo has a width of 720 pixels.
The photo has a height of 540 pixels.

(a) Write down the ratio of the width of the photo to the height of the photo.

Give your ratio in its simplest form.

720 : 540
72 : 54
8 : 6
4 : 3

..... 4 : 3 .....

(2)

Emma wants the ratio of the width of the photo to the height of the photo to be 3 : 2
She reduces the number of pixels in the height of the photo.
The width of the photo is still 720 pixels.

The ratio of the width of the photo to the new height of the photo is 3 : 2

(b) Work out the new height of the photo.

3 parts = 720
1 part = 240
2 parts = 480

..... 480 ..... pixels

(2)

(Total for question = 4 marks)

Q13.

Jon shares £700 equally between his two children, Ellie and Maddie.

Ellie gives £125 of her share of the money to Maddie.

(a) Write down the ratio of the amount of money Ellie now has to the amount of money Maddie now has.

350 : 350
125 125
225 : 475

225 : 475
= 9 : 19

(2)

Jenny shares £630 between her two children, Daniel and Rose, in the ratio 5 : 13

(b) Work out how much money Jenny gives to each child.

18 shares = 630
1 share = 35

Daniel £ ..... 175 .....

5 x 35 = 175
13 x 35 = 455

Rose £ 455

(3)

(Total for question = 5 marks)

Q14.

Rob is learning about the planets.

Rob makes a model of the Sun.
He also makes a model of the planet Jupiter.

Rob is going to hang the two models in the school hall.

Rob wants a distance of 16 m between the two models.
The real distance between the planet Jupiter and the Sun is 8×10^8 km.

Work out the scale Rob should use.
Give your answer in the form 1 : *n*

16 m : 8×10^8 km
= 16 m : 8×10^{11} m
= 1 : 0.5×10^{11}
= 1 : 5×10^{10}
or 1 : 50,000,000,000

. . . . . .

(Total for Question is 3 marks)

Q15.

5 parts = 60
1 part = 12

36 girls 24 boys

60 children go to a nursery.
The ratio of girls to boys is 3 : 2

The children go to the nursery either in the morning or in the afternoon.

$\frac{3}{4}$ of the children go to the nursery in the morning.

$\frac{1}{4}$ in afternoon

The rest of the children go to the nursery in the afternoon.

$\frac{1}{4} \times 60 = 15$ children

7 boys go to the nursery in the afternoon.

7 boys so 8 girls

Work out how many girls go to the nursery in the morning.

28

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Girls on morning = 36 - 8

= 28

(Total for question = 5 marks)