| Name ANSWERS | Class |
|---|---|

MATHS TEACHER HUB

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# Ratio

## (9 – 1) Topic booklet

# Foundation

**These questions have been collated from previous years GCSE Mathematics papers.**

| **You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. | Total Marks |
|---|---|

## Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**
- If the question is a **1F** question you are not allowed to use a calculator.
- If the question is a **2F** or a **3F** question, you may use a calculator to help you answer.

### Information

- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

**Answer ALL questions**
**Write your answers in the space provided.**
**You must write down all the stages in your working.**

**5** A path is made of white tiles and grey tiles.

$\frac{1}{4}$ of the tiles are white.

(a) Write down the ratio of white tiles to grey tiles.

$\frac{1}{4} : \frac{3}{4}$
W G

1 : 3

There is a total of 56 tiles.

(b) Work out the number of grey tiles.

1 : 3
14 : 42

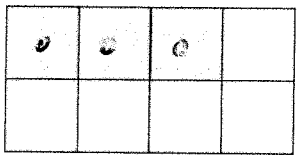
56 ÷ 4 = 14

42

June 2017 – Paper 3F

**(Total for Question 5 is 3 marks)**

**6** Here is a grid of squares.



Write down the ratio of the number of shaded squares to the number of unshaded squares.

3 : 5

November 2019 – Paper 3F

**(Total for Question 6 is 1 mark)**

6 Annie and Lily share some money in the ratio 4 : 3

(a) What fraction of the money does Lily get?

$\frac{3}{7}$

Rosie and Dan share some sweets.

Dan gets $\frac{1}{4}$ of the sweets.

(b) Write down the ratio of the number of sweets Rosie gets to the number of sweets Dan gets.

R D

$\frac{3}{4} : \frac{1}{4}$

3 : 1

November 2017 – Paper 2F

**(Total for Question 6 is 2 marks)**

6 Here are the instructions for making a drink.

| |
|---|
| Add 100 ml of juice<br>to 2 litres of water |

Dev uses 5 litres of water to make the drink.

5 litres = 5000ml

How much drink has he made?

2 litres + 100ml

1 litre + 50ml

5 litres + 250ml

5000ml + 250ml

5250ml

or

5.25 litres

Specimen 2 – Paper 1F

**(Total for Question 6 is 3 marks)**

**8** 1 yard is 36 inches.
10 cm is an approximation for 4 inches.

Work out an approximation for the number of cm in 2 yards.

1 yard = 36 inches
2 yard = 72 inches

4 inches = 10 cm
×18 ↳ 72 inches = 180cm

180cm

Sample 1 – Paper 3F

**(Total for Question 8 is 3 marks)**

**9** (a) A bag contains red counters and blue counters only.

number of red counters : number of blue counters = 3 : 4

Write down the fraction of the counters that are red.

$\frac{3}{7}$

(b) Write the ratio 12 : 30 in the form 1 : $n$

6 : 15
2 : 5
1 : 2·5

1 : 2·5

May 2020 – Paper 1F

**(Total for Question 9 is 3 marks)**

**10** There are 24 red counters and 40 blue counters in a bag.

Write down the ratio of the number of red counters to the number of blue counters in the bag.
Give your ratio in its simplest form.

24 : 40
12 : 20
6 : 10
3 : 5

3 : 5

November 2023 – Paper 2F

**(Total for Question 10 is 2 marks)**

**10** A farmer has 20 boxes of eggs.
There are 6 eggs in each box.

Write, as a ratio, the number of eggs in two boxes to the total number of eggs.
Give your answer in its simplest form.

12 : 120
6 : 60
1 : 10

1 : 10

June 2017 – Paper 1F

**(Total for Question 10 is 2 marks)**

**10** $ABC$ is a straight line.


The length $AB$ is five times the length $BC$.
$AC = 90$ cm.

Work out the length $AB$.

90 ÷ 6 = 15

5x = 75

75 cm

June 2017 – Paper 3F

**(Total for Question 10 is 3 marks)**

**10** There are 24 cows and 36 sheep on a farm.

Write as a ratio the number of cows to the number of sheep.
Give your ratio in its simplest form.

24 : 36

12 : 18

6 : 9

2 : 3

2 : 3

May 2024 – Paper 1F

**(Total for Question 10 is 2 marks)**

**10** There are only black pens and green pens in a box.
The ratio of the number of black pens in the box to the number of green pens in the box is 2 : 5

What fraction of the pens are black?

$\frac{2}{7}$

Sample 1 – Paper 1F

**(Total for Question 10 is 1 mark)**

**11** There are only red counters, blue counters and green counters in a bag.

number of red counters : number of blue counters : number of green counters = 2 : 16 : 7

What fraction of the counters in the bag are green counters?

$\frac{7}{25}$

November 2023 – Paper 3F

**(Total for Question 11 is 2 marks)**

**11** There are 30 children in a nursery school.
At least 1 adult is needed for every 8 children in the nursery.

(a) Work out the least number of adults needed in the nursery.

A : C
1 : 8
2 : 16
3 : 24
4 : 32

4

2 more children join the nursery.

(b) Does this mean that more adults are needed in the nursery?
You must give a reason for your answer.

No, 4 adults are still needed for 32 children.

November 2017 – Paper 1F

**(Total for Question 11 is 3 marks)**

**12** Amol, Gemma and Harry each have a number of sweets.

The number of sweets that Gemma has is 6 times the number of sweets that Amol has.
The number of sweets that Harry has is half the number of sweets that Gemma has.

Write down the ratio

| the number of sweets that Amol has | : | the number of sweets that Gemma has | : | the number of sweets that Harry has |
|---|---|---|---|---|

x : 6x : 3x

1 : 6 : 3

1 : 6 : 3

November 2022 – 3F

**(Total for Question 12 is 2 marks)**

**12** There are two drama groups in a school.

In one group there are 36 boys and 48 girls.

In the other group, $\frac{3}{7}$ of the students are boys and the rest of the students are girls.

Ann says,

"The ratio of the number of boys to the number of girls is the same for both groups."

Is Ann correct?
You must show how you get your answer.

36 : 48
18 : 24
9 : 12
3 : 4

$\frac{3}{7} : \frac{4}{7}$

3 : 4

Yes Ann is correct, both ratios are 3 : 4



**(Total for Question 12 is 3 marks)**

**12** Ali, Ben and Cathy share an amount of money in the ratio 6 : 9 : 10

What fraction of the money does Ben get?

$\frac{9}{25}$

June 2019 – Paper 3F

**(Total for Question 12 is 2 marks)**

**12** There are 28 red pens and 84 black pens in a bag.

Write down the ratio of the number of red pens to the number of black pens.
Give your ratio in its simplest form.

28 : 84

14 : 42

2 : 6

1 : 3

1 : 3

Specimen 1 – Paper 1F

**(Total for Question 12 is 2 marks)**

**12** Helen has 80 books to sell.

Each book is Fiction or Non-fiction.
The ratio of the number of Fiction books to the number of Non-fiction books is 3:1

Each book has a normal price of £10
Helen reduces the price of all the Non-fiction books.

| **Non-fiction** |
| --- |
| All books<br>½ price |

$80 \div 4 = 20$

Fiction = 60 books

Non Fiction = 20 books

Helen sells all 80 books.

Work out the total amount of money Helen will receive.

$60 \times £10 = £600$

$20 \times £5 = £100$

£ 700



**(Total for Question 12 is 4 marks)**

**13** In the Northern hemisphere the ratio of the area of land to the area of water is 2 : 3

(a) Work out what percentage of the area of the Northern hemisphere is land.

$\frac{2}{5} = \frac{20}{50} = \frac{40}{100}$

40 %

20% of the area of the Southern hemisphere is land.

(b) Work out the ratio of the area of land to the area of water in the Southern hemisphere.

20% : 80%

2 : 8

1 : 4

1 : 4



**(Total for Question 13 is 4 marks)**

**13** Azmol, Ryan and Kim each played a game.

Azmol's score was four times Ryan's score.
Kim's score was half of Azmol's score.

Write down the ratio of Azmol's score to Ryan's score to Kim's score.

A R K
4x x 2x
4 : 1 : 2

4 : 1 : 2

November 2018 – Paper 1F

**(Total for Question 13 is 2 marks)**

**14** Last week, 73% of the tickets sold at a cinema were adult tickets.

(a) What percentage of the tickets sold were **not** adult tickets?

27 %

Some people watched a film at the cinema.

number of adults : number of children = 2 : 5

(b) What fraction of these people were adults?

$\frac{2}{7}$

June 2023 – Paper 1F

**(Total for Question 14 is 2 marks)**

**14** Write the ratio 4.5 : 2.25 in the form $n$ : 1

4.5 : 2.25 ÷ 2.25

2 : 1

2 : 1

June 2019 – Paper 2F

**(Total for Question 14 is 1 mark)**

**14** Gavin, Harry and Isabel each earn the same monthly salary.

Each month,

Gavin **saves** 28% of his salary and spends the rest of his salary

Harry spends $\frac{3}{4}$ of his salary and **saves** the rest of his salary

the amount of salary Isabel saves : the amount of salary she spends = 3 : 7

Work out who saves the most of their salary each month.
You must show how you get your answer.

Gavin

Save 28%  Spend 72%

Harry

Save $\frac{1}{4}$ 25%  Spend $\frac{3}{4}$ 75%

Isabel

Save 3 : Spend 7

30%  70%

Isabel saves the most each month

May 2018 – Paper 1F

**(Total for Question 14 is 4 marks)**

**15** There are only red beads and green beads in a bag.

number of red beads : number of green beads = 1 : 4

There are 35 red beads in the bag.

Work out the total number of beads in the bag.

35 x 4 = 140 green

175

June 2023 – Paper 3F

**(Total for Question 15 is 2 marks)**

**15** Jamil makes a drink by mixing

1 part of orange squash with 9 parts of water.

He uses 750 millilitres of orange squash.

Jamil is going to put the drink he has mixed into 1 litre bottles.

1 litre = 1000ml

Work out the greatest number of 1 litre bottles that Jamil can completely fill.

| Orange | : | water |
|---|---|---|
| 1 | : | 9 |
| 750 | : | 6750 |

Total drink = 7500ml

7

May 2020 – Paper 1F

**(Total for Question 15 is 3 marks)**

**15** Shahid is going to use these instructions to make a fizzy drink.

| |
|---|
| Mix 5 parts of orange juice<br>with 2 parts of lemonade |

Shahid thinks that he has 300 m/ of orange juice and 200 m/ of lemonade.

(a) If Shahid is correct, what is the greatest amount of fizzy drink he can make?

5 parts = 300ml
1 parts = 60ml
2parts = 120ml

300ml of orange + 120ml lemonade

420 ml

Shahid has 300 m/ of orange juice but he only has 160 m/ of lemonade.

(b) Does this affect the greatest amount of fizzy drink he can make?
Give a reason for your answer.

No, he needs only 120ml of lemonade.



**(Total for Question 15 is 4 marks)**

**15** There are only red buttons, yellow buttons and orange buttons in a jar.
The number of red buttons, the number of yellow buttons and the number of orange buttons are in the ratio 7 : 4 : 9

Work out what percentage of the buttons in the jar are orange.

$\frac{9}{20} = \frac{45}{100}$ (×5)

45 %

November 2017 – Paper 1F **(Total for Question 15 is 2 marks)**

**15** The ratio of the cost of one metre of cotton fabric to the cost of one metre of silk fabric is 2 : 5

Complete the table of costs.

2 : 5
↓ ↓
6 : 15

| | 2 m | 6 m | 8 m | 9 m |
|---|---|---|---|---|
| **cotton fabric** | £6 | £18 | £24 | £27 |
| **silk fabric** | £15 | £45 | £60 | £67.50 |

November 2017 – Paper 3F **(Total for Question 15 is 3 marks)**

**15** There are 5 grams of fibre in every 100 grams of bread.

A loaf of bread has a weight of 400 g.
There are 10 slices of bread in a loaf.

Each slice of bread has the same weight.

Work out the weight of fibre in one slice of bread.

100g = 5g fibre
400g = 20g fibre

1 slice = 40g

2 g



**(Total for Question 15 is 3 marks)**

**15** There are 35 pens in a box.
15 of the pens are green.
The rest of the pens are red. 20 red pens

(a) What fraction of the pens in the box are red?

$\frac{20}{35}$ or $\frac{4}{7}$

(b) Write down the ratio of the number of green pens to the number of red pens.
Give your ratio in its simplest form.

15 : 20
3 : 4

3 : 4



**(Total for Question 15 is 3 marks)**

**16** In a bag there are only red counters, blue counters, green counters and yellow counters.
A counter is taken at random from the bag.

The table shows the probabilities of getting a red counter or a yellow counter.

| **Colour** | red | blue | green | yellow |
|---|---|---|---|---|
| **Probability** | 0.4 | 0.15 | 0.2 | 0.25 |

the number of blue counters : the number of green counters = 3 : 4

Complete the table.

$1 - 0.4 - 0.25 = 0.35$

$0.35 \div 7 = 0.05$



**(Total for Question 16 is 4 marks)**

**16** Write down the ratio of 450 grams to 15 grams.
Give your answer in its simplest form.

450 : 15

90 : 3

30 : 1

30 : 1



**(Total for Question 16 is 2 marks)**

**16** Alan, Bispah and Chan share a sum of money.

Alan gets $\frac{1}{8}$ of the money.

Bispah gets $\frac{1}{2}$ of the money.

Chan gets the rest of the money.

Alan gets £2.50

(a) Work out how much money Bispah gets.

$\frac{1}{8} = 2.50$

$\frac{8}{8} = 20$

£ 10

(b) Find the ratio

amount of money Alan gets : amount of money Chan gets

Give your answer in the form $a : b$ where $a$ and $b$ are whole numbers.

10 : 7.50

4 : 3

4:3



**(Total for Question 16 is 5 marks)**

**17** There are only blue counters, green counters, red counters and yellow counters in a bag.

The table shows the number of blue counters in the bag.

| **Colour** | blue | green | red | yellow |
|---|---|---|---|---|
| **Number of counters** | 30 | | | |

There is a total of 100 counters in the bag.

Ashin takes at random a counter from the bag.

(a) Find the probability that the counter is **not** blue.

$\frac{70}{100}$ or $\frac{7}{10}$

The ratio of the number of blue counters to the number of green counters is 2 : 3

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

2 : 3

×15 ↘ 30 : 45

45

Bradley says,

"The number of red counters in the bag is the same as the number of yellow counters in the bag."

(c) Can Bradley be correct?
Give a reason for your answer.

30 blue, 45 green, this leaves 25 counters left, which cannot be halved to get two equal values



**(Total for Question 17 is 5 marks)**

17 Scott wants to make orange juice.
He is going to buy boxes of oranges.

There are 24 oranges in each box of oranges.

30 oranges make 2 litres of orange juice.

Scott needs to buy enough oranges to make 8 litres of orange juice.

(a) Work out the number of boxes of oranges that Scott needs to buy.
You must show all your working.

2 litres = 30 oranges

8 litres = 120 oranges.

120 ÷ 24 = 5 boxes

5

Scott also buys
1260 apples
280 bananas

(b) Write down the ratio of the number of apples that Scott buys to the number of bananas that he buys.
Give your ratio in its simplest form.

1260 : 280

126 : 28

63 : 14

9 : 2

9:2

**(Total for Question 17 is 5 marks)**

**17** There are some chocolates in a box.

$\frac{1}{4}$ of the chocolates contain nuts.

The rest of the chocolates do not contain nuts.

Write down the ratio of the number of chocolates that contain nuts to the number of chocolates that do not contain nuts.
Give your answer in the form 1 : $n$

$\frac{1}{4} : \frac{3}{4}$

1 : 3

**(Total for Question 17 is 2 marks)**

**18** There are 240 cans of drink on a shelf.
Each can contains cola or lemonade or orange.

the number of cans of cola : the number of cans of lemonade : the number of cans of orange = 5 : 3 : 2

$\frac{1}{2}$ of the cans of lemonade and $\frac{1}{12}$ of the cans of orange are removed from the shelf.

Work out the number of cans of cola as a percentage of the total number of cans of drink remaining on the shelf.

$240 \div 10 = 24$

Cola $5 \times 24 = 120$

Lemonade $3 \times 24 = 72$

Orange $2 \times 24 = 48$

$\frac{1}{2}$ of $72 = 36$

$\frac{1}{12}$ of $48 = 4$

Cans remaining:

Cola = 120

lemonade = 36

Orange = 44

200

Cola $= \frac{120}{200} = \frac{60}{100} = 60\%$

60 %



**(Total for Question 18 is 5 marks)**

**18** Harry, Regan and Kelan share £450 in the ratio 2 : 5 : 3

How much money does Kelan get?

$450 \div 10 = 45$

$2 : 5 : 3$

$90 : 225 : 135$

H R K

£ 135



**(Total for Question 18 is 2 marks)**

**18** 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.

A C
5/7 2/7

60% of 2600 = 1560

117 = $\frac{1}{4}$ of the children (Circle)

351 = $\frac{3}{4}$ of children (stalls)

468 children in total

$\frac{2}{7}$ = 468

$\frac{1}{7}$ = 234

$\frac{5}{7}$ = 1170 Adults

1638 people in total

$\frac{1638}{2600}$ = 63%

Yes more than 60% of the seats have people on.



**(Total for Question 18 is 5 marks)**

**18** 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.

$\frac{2}{7}$ of 420 = 120 vanilla

0.35 x 420 = 147 banana

120 + 147 = 267

420 − 267 = 153

153 ÷ 9 = 17

L : C
4 : 5
x17
68 : 85

85

June 2017 – Paper 3F

**(Total for Question 18 is 5 marks)**

**18** In a breakfast cereal, 40% of the weight is fruit.
The rest of the cereal is oats.

(a) Write down the ratio of the weight of fruit to the weight of oats.
Give your answer in the form 1 : $n$.

F : O
40 : 60
4 : 6
2 : 3

2 : 3

A different breakfast cereal is made using only fruit and bran.
The ratio of the weight of fruit to the weight of bran is 1 : 3

(b) What fraction of the weight of this cereal is bran?

$\frac{3}{4}$

Specimen 1 – Paper 3F

**(Total for Question 18 is 3 marks)**

**18** There are 64 cards in a pack.
Each card is either red or black.
The ratio of the number of red cards to the number of black cards is 1 : 1

8 red cards are removed from the pack.

Find the ratio of the number of red cards now in the pack to the number of black cards now in the pack.
Give your answer in its simplest form.

Red Black
32 32
-8
24

R : B
24 : 32
12 : 16
3 : 4

3 : 4



**(Total for Question 18 is 3 marks)**

**20** 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?

H : F : B

×2 7 : 4

8 : 5

14 : 8 : 5

50 ×10

140



**(Total for Question 20 is 3 marks)**

**20** Pens and pencils are sold in a shop.

12 pencils cost £1.80

The ratio of the cost of a pen to the cost of a pencil is 7 : 3

Work out the cost of 5 pens.

$1.80 \div 12 = 0.15$

1 pencil = 15p

pen : pencil

7 : 3 ) ×5

35 : 15p

1 pen = 35p

£ 1.75



**(Total for Question 20 is 4 marks)**

**21** There are 60 people in a choir.
Half of the people in the choir are women.

The number of women in the choir is 3 times the number of men in the choir.
The rest of the people in the choir are children.

the number of children in the choir : the number of men in the choir = $n$ : 1

Work out the value of $n$.
You must show how you get your answer.

Women men Children
30 10 20

Children : men
20 : 10
2 : 1

$n$ = 2



**(Total for Question 21 is 4 marks)**

**22** Natalie makes potato cakes in a restaurant.

She mixes potato, cheese and onion so that

weight of potato : weight of cheese : weight of onion = 9 : 2 : 1

Natalie needs to make 6000 g of potato cakes.

Cheese costs £2.25 for 175 g.

Work out the cost of the cheese needed to make 6000 g of potato cakes.

$6000 \div 12 = 500g$

$2 \times 500g = 1000g$ of cheese.

$\frac{1000}{175} = 5.714285\dot{}$

$5.714285 \times £2.25 = £12.86$

£ 12.86



**(Total for Question 22 is 4 marks)**

**22** 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?

B : G : R

×4 2 : 5

×5 4 : 1

8 : 20 : 5 = 33

99 ÷ 33 = 3

15

November 2017 – Paper 3F

**(Total for Question 22 is 3 marks)**

**22** The ratio of the number of boys to the number of girls in a school is 4 : 5
There are 95 girls in the school.

Work out the total number of students in the school.

Specimen 2 – Paper 3F

**(Total for Question 22 is 3 marks)**

**22** There are 48 counters in a bag.
There are only red counters and blue counters in the bag.

number of red counters : number of blue counters = 1 : 2

Helen has to work out how many red counters are in the bag.

She says,

"There are 24 red counters in the bag because 1 is half of 2 and 24 is half of 48"

Is Helen correct?
You must give a reason for your answer.

Helen is wrong, $1:2 = \frac{1}{3}:\frac{2}{3}$

$\frac{1}{3}$ are red not $\frac{1}{2}$

June 2023 – Paper 2F

**(Total for Question 22 is 1 mark)**

**22** Rob has been asked to divide 120 in the ratio 3 : 5

Here is his working.

$120 \div 3 = 40$ $120 \div 5 = 24$

Rob's working is not correct.

Describe what Rob has done wrong.

There are 8 parts in the ratio, so Rob should divide by 8.

November 2022 – 3F

**(Total for Question 22 is 1 mark)**

**23** Carlo puts tins into small boxes and into large boxes.

He puts 6 tins into each small box.
He puts 20 tins into each large box.

Carlo puts a total of 3000 tins into the boxes so that

number of tins in small boxes : number of tins in large boxes = 2 : 3

Carlo says that less than 30% of the boxes filled with tins are large boxes.

Is Carlo correct?
You must show all your working.

$\frac{3000}{5} = 600$

Tins in small boxes : Tins in large boxes

2 : 3

×600

1200 : 1800

$\frac{1200 \text{ tins}}{6} = 200 \text{ boxes}$

$\frac{1800}{20} = 90 \text{ boxes}$

$= 290 \text{ boxes}$

$\frac{90}{290} \times 100 = 31\%$ of boxes are large.

Carlo is not correct.



**(Total for Question 23 is 5 marks)**

240 ÷ 10 = 24

**23** Tom and Adam have a total of 240 stamps.
The ratio of the number of Tom's stamps to the number of Adam's stamps is 3 : 7

Tom buys some stamps from Adam.
The ratio of the number of Tom's stamps to the number of Adam's stamps is now 3 : 5

How many stamps does Tom buy from Adam?
You must show all your working.

240 ÷ 8 = 30

Tom : Adam
3 : 7
×24 ↳ 72 : 168

Tom : Adam
3 : 5
×30 ↳ 90 : 150

Tom 90 - 72 = 18

18



**(Total for Question 23 is 4 marks)**

**23** Costcorp sells packets of mints to shop owners.

On Monday three shop owners buy mints from Costcorp.
Each shop owner buys small packets, medium packets and large packets of mints.

Alan buys 400 packets of mints.
32% are small packets.
40% are large packets.

Beryl buys 500 packets of mints.

$\frac{3}{10}$ are small packets.

$\frac{1}{10}$ are large packets.

Charlie buys 150 small packets of mints so that

number of small packets : number of medium packets = 3 : 4

Work out the total number of medium packets of mints these shop owners buy.
You must show all your working.

Alan $0.32 \times 400 = 128$ small

$0.4 \times 400 = 160$ large

112 medium

---

Beryl $\frac{3}{10} \times 500 = 150$ small

$\frac{1}{10} \times 500 = 50$ large

300 medium

---

Charlie 150 small

200 medium

Total medium = $112 + 300 + 200$

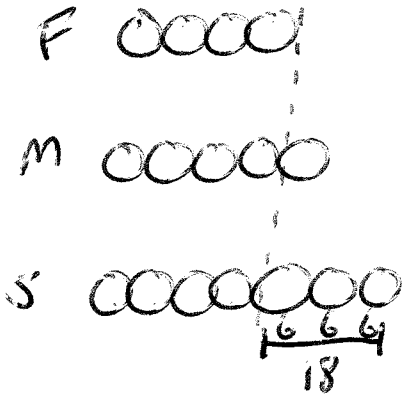
612



**(Total for Question 23 is 5 marks)**

**23** Frank, Mary and Seth shared some sweets in the ratio 4 : 5 : 7
Seth got 18 more sweets than Frank.

Work out the total number of sweets they shared.




Each part = 6

16 parts x 6 = 96

96



**(Total for Question 23 is 3 marks)**

**24** Rizwan writes down three numbers $a$, $b$ and $c$

$$a : b = 1 : 3$$
$$b : c = 6 : 5$$

(a) (i) Find $a : b : c$

a : b : c
×2 1 : 3
6 : 5
2 : 6 : 5

2 : 6 : 5

(ii) Express $a$ as a fraction of the total of the three numbers $a$, $b$ and $c$

$\frac{2}{13}$

Emma writes down three numbers $m$, $n$ and $p$

$$n = 2m$$
$$p = 5n$$

(b) Find $m : p$

n : m
2 : 1

p : n
5 : 1 ×2
10 : 2

m : p
1 : 10

1 : 10

**(Total for Question 24 is 6 marks)**

**24** Rick, Selma and Tony are playing a game with counters.

Rick has some counters.
Selma has twice as many counters as Rick.
Tony has 6 counters less than Selma.

In total they have 54 counters.

the number of counters Rick has : the number of counters Tony has = 1 : $p$

Work out the value of $p$.

| Rick | Selma | Tony | | |
|---|---|---|---|---|
| $x$ | $2x$ | $2x-6$ | = | 54 |

$5x - 6 = 54$

$+6$ $+6$

$5x = 60$

$\div 5$ $\div 5$

$x = 12$

$12 : 24 : 18$

Rick : Tony

$12 : 18$

$2 : 3$

$1 : 1.5$

$p =$ 1 : 5



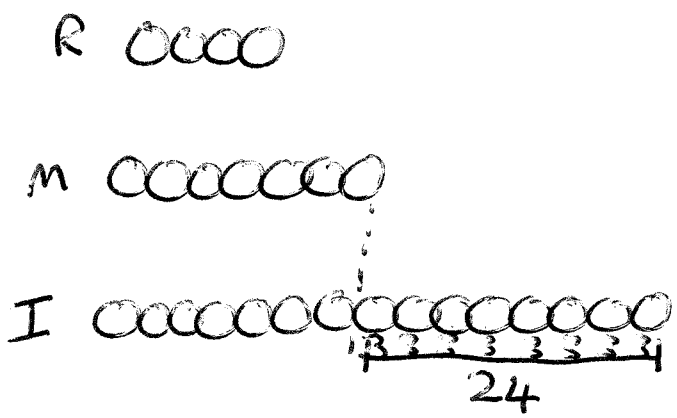
**(Total for Question 24 is 5 marks)**

**24** Rosie, Matilda and Ibrahim collect stickers.

number of stickers Rosie has : number of stickers Matilda has : number of stickers Ibrahim has = 4 : 7 : 15

Ibrahim has 24 more stickers than Matilda.

Ibrahim has more stickers than Rosie.
How many more?




Each part = 3

Ibrahim = 45

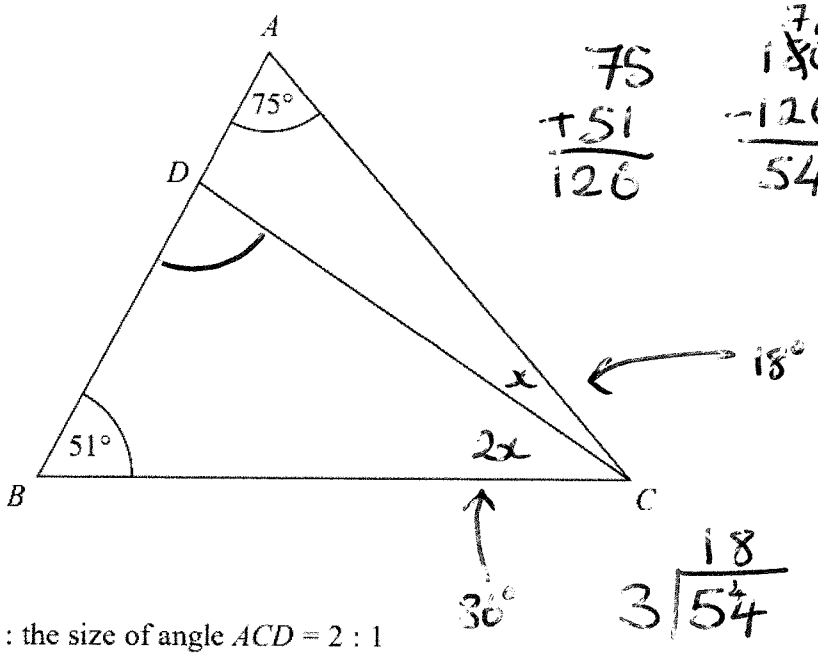
Rosie = 12

45 - 12 = 33



**(Total for Question 24 is 3 marks)**

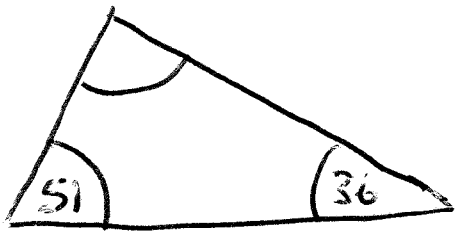
**24** The diagram shows triangle *ABC*.




*ADB* is a straight line.

the size of angle *DCB* : the size of angle *ACD* = 2 : 1

Work out the size of angle *BDC*.




93 °



**(Total for Question 24 is 4 marks)**

**25** Andy, Luke and Tina share some sweets in the ratio 1 : 6 : 14

Tina gives $\frac{3}{7}$ of her sweets to Andy.

Tina then gives $12\frac{1}{2}\%$ of the rest of her sweets to Luke.

Tina says,

"Now all three of us have the same number of sweets."

Is Tina correct?
You must show how you get your answer.

$\frac{3}{7}$ of 14 = 6

Tina gives 6 parts to Andy

Andy : Luke : Tina
7 : 6 : 8

---

12.5% of 8 = 1

Tina gives 1 to Luke

Andy : Luke : Tina
7 : 7 : 7

---

Yes Tina is correct, they all now have the same number of sweets



**(Total for Question 25 is 4 marks)**

**25** Last year a family recycled 800 kg of household waste.
57% of this waste was paper and glass.

weight of paper recycled : weight of glass recycled = 12 : 7

Calculate the weight of glass the family recycled.

$0.57 \times 800 = 456$ kg

$456 \div 19 = 24$ kg for each part

12 : 7

× 24

288 : 168

168 kg



**(Total for Question 25 is 3 marks)**

**25** A delivery company has a total of 160 cars and vans.

the number of cars : the number of vans = 3 : 7

$\frac{160}{10} = 16$ for each part

Each car and each van uses electricity or diesel or petrol.

$\frac{1}{8}$ of the cars use electricity.
25% of the cars use diesel.
The rest of the cars use petrol.

Work out the number of cars that use petrol.
You must show all your working.

Cars & Vans
3 : 7
×16
48 : 112

$\frac{1}{8}$ of 48 = 6 cars use electric

25% of 48 = 12 cars use diesel

48 − 6 − 12 = 30 cars use petrol

30



**(Total for Question 25 is 5 marks)**

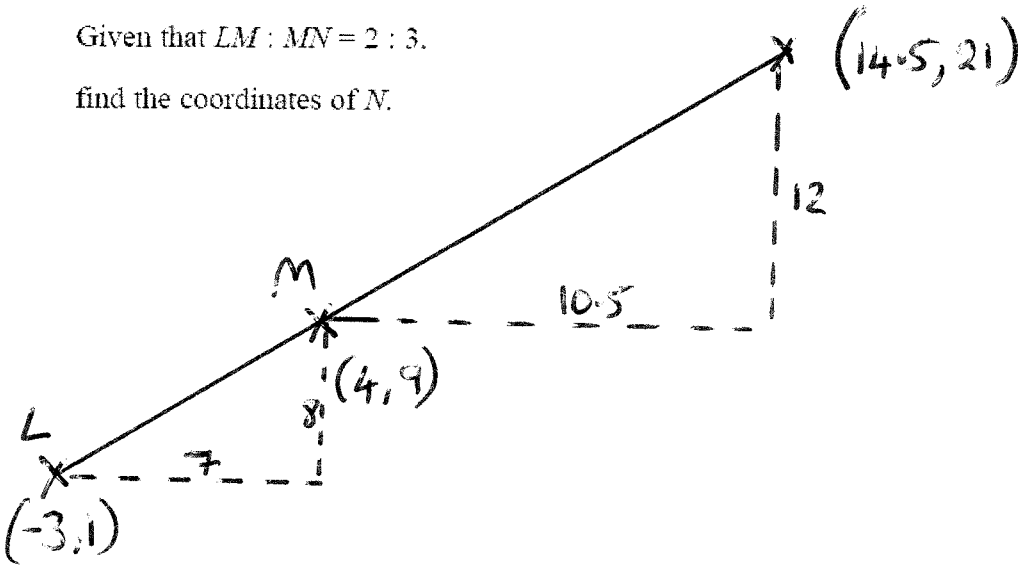
**25** The points $L$, $M$ and $N$ are such that $LMN$ is a straight line.

The coordinates of $L$ are $(-3, 1)$

The coordinates of $M$ are $(4, 9)$

Given that $LM : MN = 2 : 3$.

find the coordinates of $N$.




2 parts = $\begin{pmatrix} 7 \\ 8 \end{pmatrix}$

1 part = $\begin{pmatrix} 3{\cdot}5 \\ 4 \end{pmatrix}$

(14·5, 21)



**(Total for Question 25 is 4 marks)**

**25** 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?

60% & 40%

Men & Women

60% & 40%

40% of 60%

= 24%

10% of 40%

= 4%

28 %

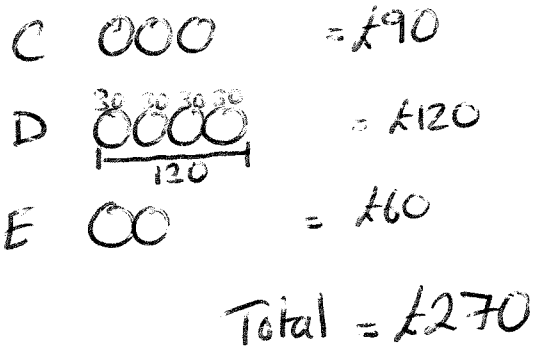


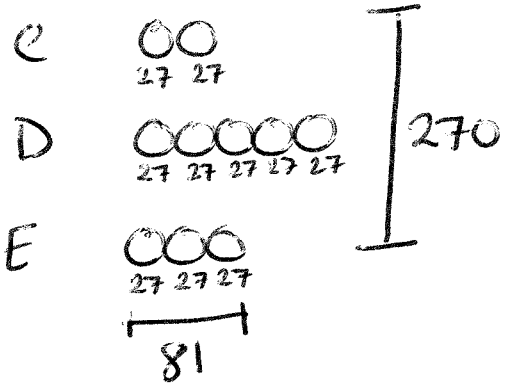
**(Total for Question 25 is 4 marks)**

**26** Chris, Debbie and Errol share some money in the ratio 3 : 4 : 2
Debbie gets £120

Chris then gives some of his share to Debbie and some of his share to Errol.
The money that Chris, Debbie and Errol each have is now in the ratio 2 : 5 : 3

How much money did Chris give to Errol?




Errol had £60
and now has £81

Chris gave Errol
£21

£ 21



**(Total for Question 26 is 4 marks)**

**26** £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.

$1.5 \times 2 = 3$

| Abby | Ben | Chloe | Denesh |
|---|---|---|---|
| 2 | 7 | 3 | 3 |

$\frac{360}{15} = 24$

$\text{Ben} = 7 \times 24 = 168$

£ 168



**(Total for Question 26 is 4 marks)**

**26** Kasim has some small jars, some medium jars and some large jars.
He has a total of 400 jars.

$\frac{3}{8}$ of the 400 jars are empty.

For the empty jars,

number of small jars : number of medium jars = 3 : 4
number of medium jars : number of large jars = 1 : 2

Work out the percentage of Kasim's jars that are empty small jars.

$\frac{3}{8}$ of 400 = 150 empty

Small : medium : large
3 : 4
1 : 2
×4
3 : 4 : 8
×10
30 : 40 : 80
30 small empty jars

$\frac{150}{15} = 10$

$\frac{30}{400} = \frac{15}{200} = \frac{7.5}{100}$

7.5 %

**(Total for Question 26 is 5 marks)**

**27** A shop sells packs of black pens, packs of red pens and packs of green pens.

There are

2 pens in each pack of black pens
5 pens in each pack of red pens
6 pens in each pack of green pens

On Monday,

number of packs of black pens sold : number of packs of red pens sold : number of packs of green pens sold = 7 : 3 : 4

A total of 212 pens were sold.

Work out the number of green pens sold.

Black : Red : Green.

7x2 : 3x5 : 4x6

14 : 15 : 24 = 53

$\frac{212}{53} = 4$

| | B | | R | | G |
|---|---|---|---|---|---|
| | 14 | : | 15 | : | 24 |
| x4 → | 56 | : | 60 | : | 96 |

96



**(Total for Question 27 is 4 marks)**

**27** 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?

Cows : sheep : pigs

×2 6 : 5

×5 2 : 1

12 : 10 : 5 = 27 parts

×7 ↳ 84 : 70 : 35

$\frac{189}{27} = 7$

70



**(Total for Question 27 is 3 marks)**

**29** Given that $\frac{a}{b} = \frac{2}{5}$ and $\frac{b}{c} = \frac{3}{4}$

a : b = 2 : 5 b : c = 3 : 4

find $a : b : c$

a : b : c

×3 2 : 5

3 : 4

×5

6 : 15 : 20

6 : 15 : 20



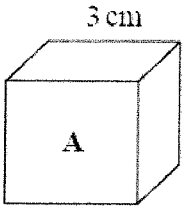
**(Total for Question 29 is 3 marks)**

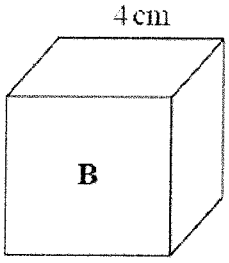
29 Here are two cubes, **A** and **B**.

Density = mass / volume

$V = 3^3$

$= 27cm^3$




$V = 4^3$

$= 64cm^3$

Cube **A** has a mass of 81 g.

Cube **B** has a mass of 128 g.

Work out

the density of cube **A** : the density of cube **B**

Give your answer in the form $a : b$, where $a$ and $b$ are integers.

(A) $D = \frac{81g}{27cm^3} = 3g/cm^3$

(B) $D = \frac{128g}{64cm^3} = 2g/cm^3$

3 : 2

3 : 2



**(Total for Question 29 is 3 marks)**