

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic

Ratio, proportion and rates of change

Sharing amounts in a given ratio (non-calculator)

v1.0

Name _____

Materials

For this paper you must have:

- Mathematical instruments
- A calculator



Information

- The marks for questions are shown in brackets

Advice

- In all calculations, show clearly how you work out your answer

Q1.

Joe, Kim and Lisa each have an amount of money.

Joe has £72

Joe's amount : Kim's amount = 6 : 5

Lisa's amount is $1\frac{1}{2}$ times Joe's amount.

Show that, in total, they have **less** than £250

(Total 3 marks)

Q2.

(a) Divide £720 in the ratio 5 : 1

(2)

(b) Sarah has £135

Gemma has £70

Beth has £35

Sarah gives some money to Gemma and Beth.

The ratio of the amount of money Sarah, Gemma and Beth have **now** is 3 : 2 : 1

How much money did Sarah give to Gemma?

(4)

(Total 6 marks)

Q3.

Jess saves 2p, 5p and 10p coins.

She has

- 45 10p coins
- 8 times as many 2p coins as **10p coins**
- £17.70 in total.

Work out total **value** of 2p coins : total **value** of 5p coins

Give your answer in its simplest form.

(Total 4 marks)

Q4.

A sauce is made from cream and stock in the ratio

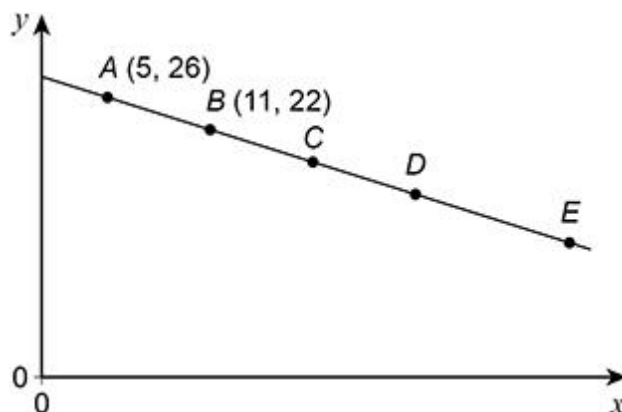
cream : stock = 1 : 6

How much **sauce** can be made using 80 millilitres of cream?

(Total 2 marks)

Q5.

A, B, C, D and E are points on a straight line.



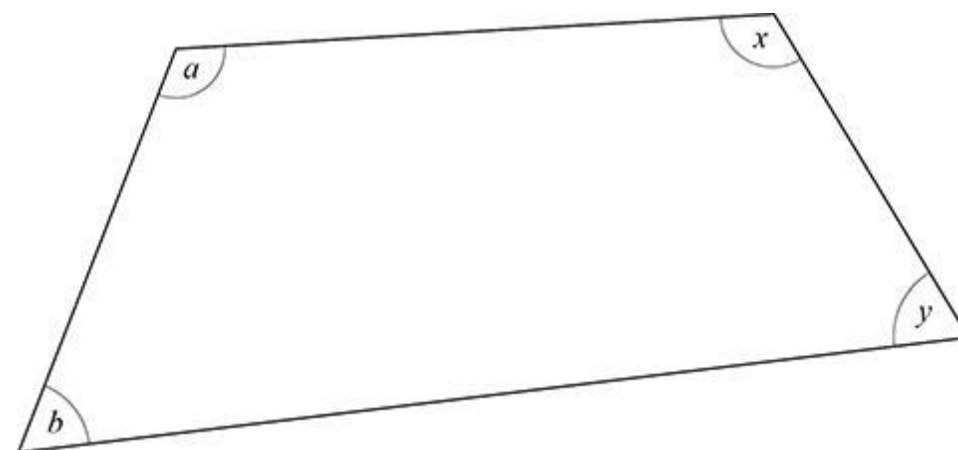
A, B, C and D are equally spaced.

AD : DE = 2 : 1

Work out the coordinates of E.

(Total 3 marks)

Q6.



Not drawn
accurately

$b = 45^\circ$ and $a : b = 7 : 3$ and $x : y = 4 : 1$
Show that $a : y = 5 : 2$

(Total 3 marks)

Q7.

To get to college, 120 students either walk, cycle or travel by car.

$\frac{3}{8}$ of the students walk.

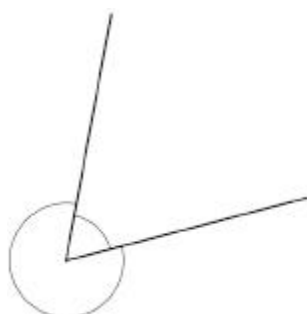
students who cycle : students who travel by car = 1 : 2

How many students travel by car?

(Total 3 marks)

Q8.

Two angles around a point are shown.



Not drawn
accurately

The angles are in the ratio 2 : 7
Show that the larger angle is 280°

(Total 2 marks)

Q9.

At a party there are 90 people.

48 are women and 42 are men.

Some women leave.

Some men arrive.

The ratio of women to men is now 10 : 11

Are there now more than 90 people at the party?

Tick **one** box.

☐

Yes

☐

No

☐

Cannot tell

Show working to support your answer.

(Total 2 marks)

Q10.

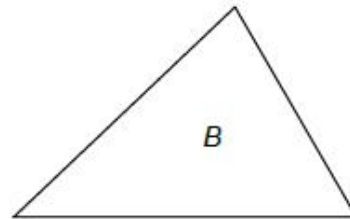
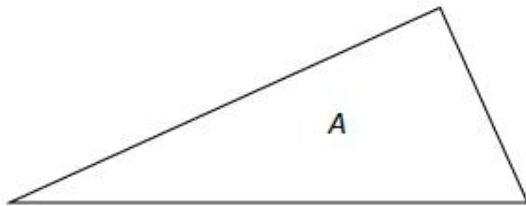
There are between 25 and 35 students in a class.
The ratio of boys to girls is 4 : 7
How many students are in the class?

(Total 2 marks)

Q11.

The angles in triangle A are in the ratio 1 : 2 : 3
The angles in triangle B are in the ratio 4 : 5 : 6

Not drawn
accurately



Jack says,
“The middle number in each ratio is one third of the total,
so one of the angles in each triangle is 60 degrees”
Is he correct?
Show working to support your answer.

(Total 2 marks)

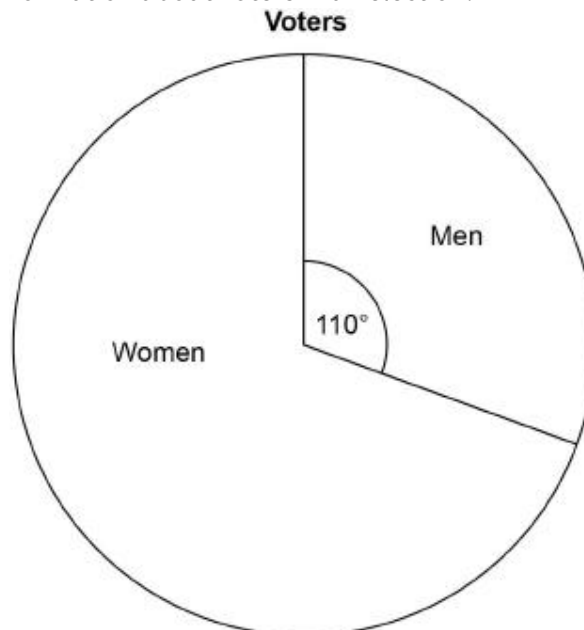
Q12.

At a football game
number of men : number of women : number of children = 13 : 5 : 7
There are 4152 **more** men than women.
Work out the number of children at the game.

(Total 3 marks)

Q13.

The pie chart shows information about voters in an election.

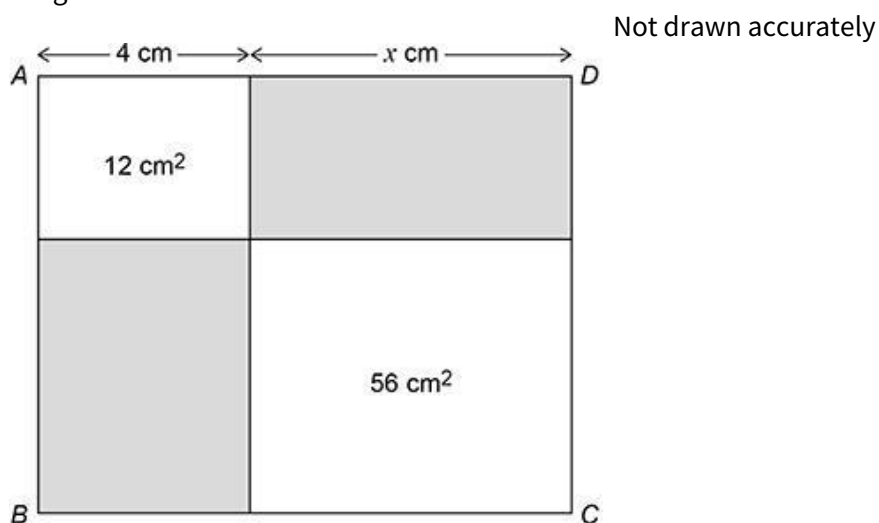


3360 **more** women voted than men.
Work out the total number of voters.

(Total 3 marks)

Q14.

Rectangle $ABCD$ is split into four smaller rectangles.
Two of the smaller rectangles are shaded.



$$4 : x = 1 : 2$$

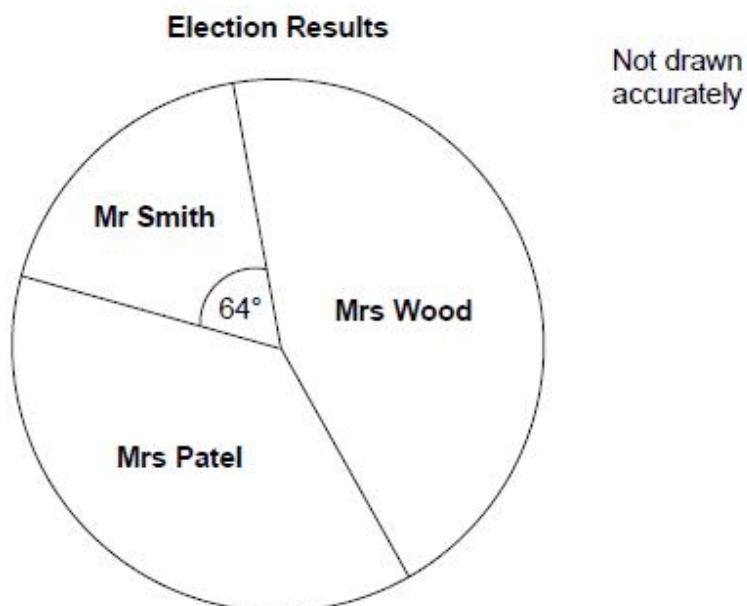
For rectangle $ABCD$, work out the ratio shaded area : unshaded area

Give your answer in its simplest form.

(Total 4 marks)

Q15.

The pie chart shows some information about the share of votes for candidates in an election.



The angle for Mrs Wood would be 24° more than the angle for Mrs Patel.

There were 5220 votes in total.

Work out the number of votes for Mrs Patel.

(Total 4 marks)

Q16.

Rana sells 192 cakes in the ratio small : medium : large = 7 : 6 : 11

The profit for one medium cake is twice the profit for one small cake.

The profit for one large cake is three times the profit for one small cake.

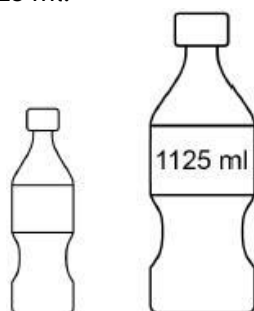
Her total profit is £532.48

Work out the profit for one small cake.

(Total 5 marks)

Q17.

Juice is sold in small bottles and large bottles.
The volume of the large bottle is 1125 ml.



volume of small bottle : volume of large bottle = 2 : 5

A café has small glasses and large glasses.

volume of small glass : volume of large glass = 4 : 7

A small bottle fills 6 small glasses with no juice left over.

How many large glasses can be filled by a large bottle?

You **must** show your working.

(Total 4 marks)

Q18.

Three teams, A, B and C, play in a competition.

games won by A : games won by B = 2 : 1

games won by B : games won by C = 3 : 1

Team B has won 6 games.

In total, how many games have the three teams won?

(Total 3 marks)

Q19.

Jeff and Kaz share £270 in the ratio Jeff : Kaz = 2.6 : 1

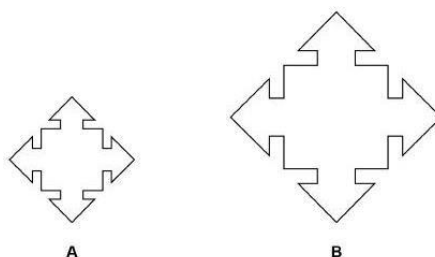
How much **more** than Kaz does Jeff get?

(Total 3 marks)

Q20.

Here are two similar shapes, A and B.

Not drawn accurately



length of edges in A : length of edges in B = 2 : 5

The perimeter of A is 210 mm

Work out the perimeter of B.

(Total 2 marks)

Q21.

Here are two sets of numbers, A and B.

Set A

200	160
104	100

Set B

270	400	483
300		x

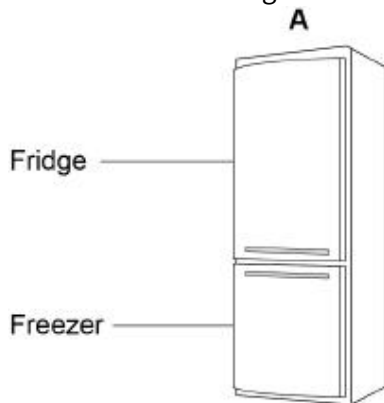
mean of Set A : mean of Set B = 3 : 8

Work out the value of x .

(Total 4 marks)

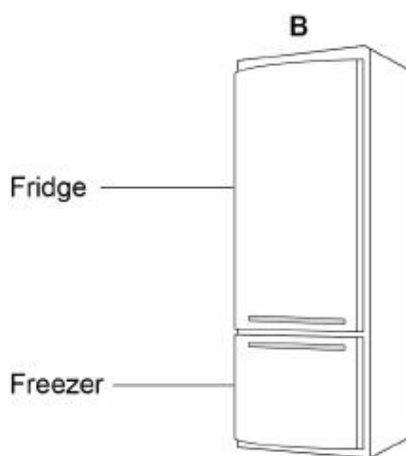
Q22.

Information about two fridge-freezers, A and B, is shown.



Total capacity is 330 litres

fridge capacity : freezer capacity = 3 : 2



Fridge capacity is 294 litres

fridge capacity : freezer capacity = 7 : 3

Grace buys one of these fridge-freezers.
She buys the one with the greater **freezer** capacity.
Which one does she buy?
You **must** show your working.

(Total 4 marks)

Q23.

A toy is made from red bricks and yellow bricks.
Number of red bricks : number of yellow bricks = 5 : 2
There are 210 **more** red bricks than yellow bricks.
How many red bricks are in the toy?

(Total 3 marks)

Q24.

150 people work in an office.
The ratio of men to women is 2 : 3
How many **men** are there?

(Total 2 marks)

Q25.

Divide 4860 in the ratio 5 : 4 : 3

(Total 3 marks)

Q26.

Concrete is made by mixing cement, sand and gravel in the ratio 1 : 2 : 4
A builder mixes 455 kg of concrete.
How much gravel does he need?

(Total 3 marks)

Q27.

Here are two piles of the same type of paper.
Each sheet of paper weighs 5 g.
The taller pile weighs 7.5 kg.



weight of taller pile : weight of shorter pile = 5 : 3

Work out the number of sheets of paper in the shorter pile.

(Total 3 marks)

Q28.

Peter and Alice buy a set of golf clubs for their mother.
They pay in the ratio 4 : 3
Peter pays £224.
How much does Alice pay?

(Total 3 marks)

Q29.

Harry and his sister Jess have some money in the ratio Harry : Jess = 1 : 4
Harry has £7.35
They pay £16.99 for a present for a friend.

Harry uses $\frac{1}{3}$ of his money.
Jess pays the rest.

How much money does Jess have left?

(Total 4 marks)

Q30.

John has 500 ml of apple juice.

He wants to mix apple juice with fizzy water in the ratio 1 : 10

Fizzy water is sold in 1500 ml bottles.

Work out the smallest number of bottles of fizzy water needed to mix all the apple juice.

You **must** show your working.

(Total 4 marks)

Q31.

Three angles are in the ratio 2 : 3 : 7

The smallest angle is 60° .

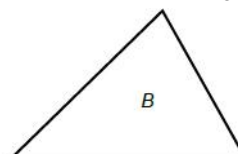
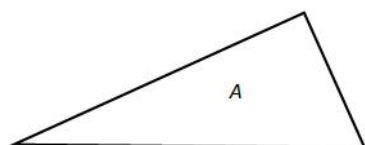
Show that these three angles will fit together at a point with no gaps.

(Total 3 marks)

Q32.

The angles in triangle A are in the ratio 1 : 2 : 5

The angles in triangle B are in the ratio 3 : 4 : 5



Not drawn accurately

Anisha says,

“The end number in each ratio is 5, so the biggest angle in each triangle must be equal.”

Is she correct?

Yes

☐

No

☐

Show working to support your answer.

(Total 2 marks)

Q33.

At a music festival, four types of instrument are played.

guitars keyboards drums trumpets

- The total number of instruments is 80
- Half of the instruments are guitars.
- keyboards : drums : trumpets = 3 : 4 : 1

How many **keyboards** are there?

(Total 4 marks)

Q34.

Two objects, J and K, are applying pressure to areas of ground.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

For J, the force is 18.9 newtons and the area is 0.45 m²

pressure for J : pressure for K = 7 : 8

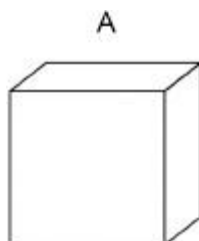
area for J : area for K = 9 : 5

Work out the force for K.

(Total 4 marks)

Q35.

Here is cuboid A.



Cuboid B is made from **two** of cuboid A.



volume of A : volume of B = 1 : 2

Matthew says,

“surface area of A : surface area of B must be 1 : 2 because B is made of 2 of A.”

Is Matthew correct?

Tick **one** box.

☐

Yes

☐

No

☐

Cannot tell

Give a reason for your answer.

(Total 2 marks)

Q36.

At a school

number of boys : number of girls = 9 : 7

There are 116 **more** boys than girls.

Work out the total number of students at the school.

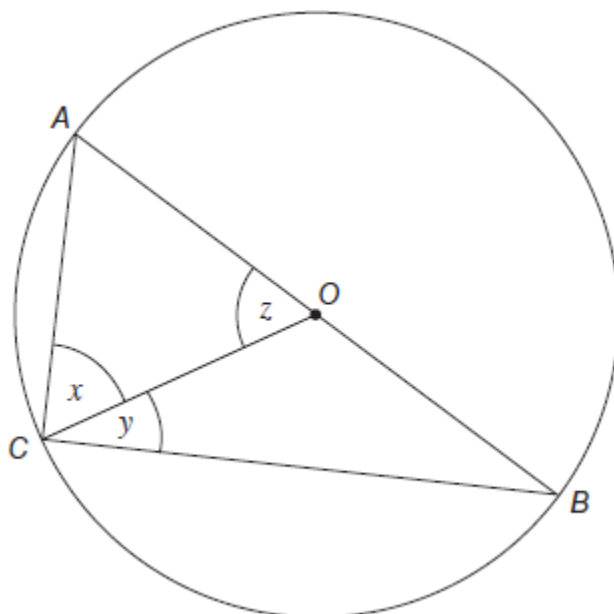
(Total 3 marks)

Questions 37 and 38 are **higher** tier only.

Q37.

(a) A , B and C are points on a circle, centre O .

Not drawn accurately



AB is a diameter.

The ratio of the size of angle x to the size of angle y is

$$x : y = 5 : 1$$

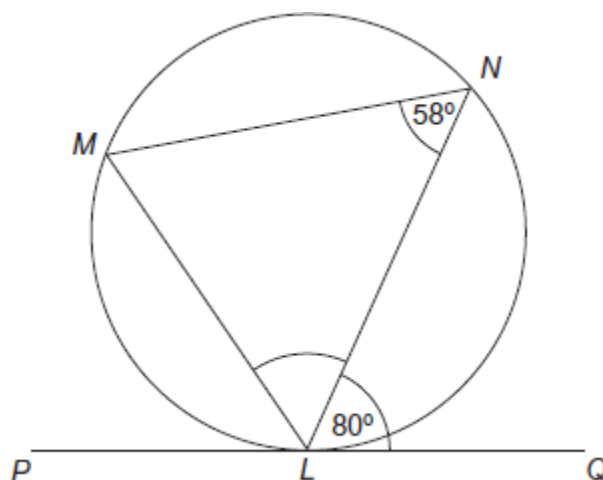
Work out the size of angle z .

(3)

(b) L , M and N are points on a circle.

PLQ is a tangent.

Not drawn accurately



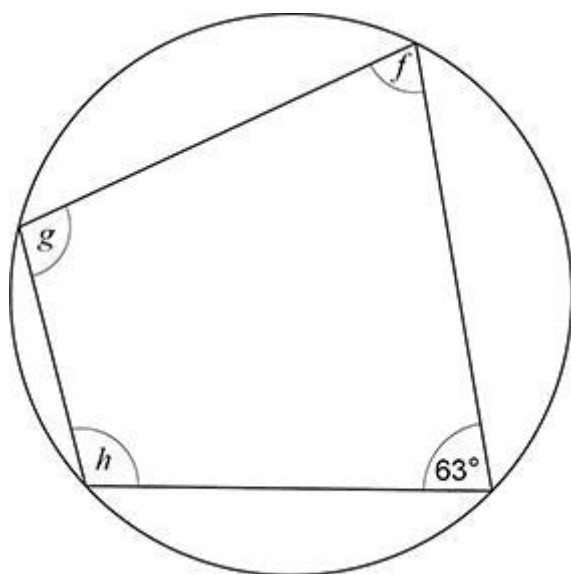
Work out angle MLN .

(3)

(Total 6 marks)

Q38.

Here is a cyclic quadrilateral.



Not drawn
accurately

$$f:g = 2:3$$

Work out $f:h$

Give your answer in its simplest form.

(Total 4 marks)