

GCSE QUESTIONS

Q1. NON-CALCULATOR

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.

..... %
(Total for question = 2 marks)

Q2. NON-CALCULATOR

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 .

.....
(2)

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?

.....
(1)
(Total for question is 3 marks)

Q3. NON-CALCULATOR

Berenika wants to buy 35 T-shirts.

Each T-shirt costs £5.80

Berenika does the calculation $40 \times 6 = 240$ to estimate the cost of 35 T-shirts.

- (a) Explain how Berenika's calculation shows the actual cost will be less than £240

.....
.....

(1)

There is a special offer.

T-shirts £5.80 each.
Buy 30 or more T-shirts.
Get 10% off the total cost.

(b) Work out the actual cost of buying 35 T-shirts using the special offer.

£

(4)

(Total for question = 5 marks)

Q4. NON-CALCULATOR

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.

.....

(Total for question = 5 marks)

Q5. NON-CALCULATOR

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

$\frac{3}{4}$

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.

(Total for question = 4 marks)

Q6. NON-CALCULATOR

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.

.....
 (Total for question = 5 marks)

Q7. NON-CALCULATOR

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

A force of 70 newtons acts on an area of 20 cm²

The force is increased by 10 newtons.

The area is increased by 10 cm²

Helen says,

"The pressure decreases by less than 20%"

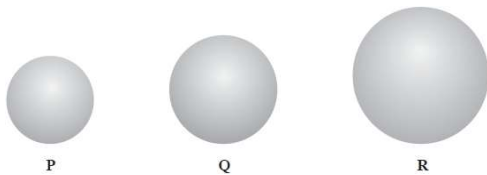
Is Helen correct?

You must show how you get your answer.

(Total for question = 3 marks)

Q8. NON-CALCULATOR

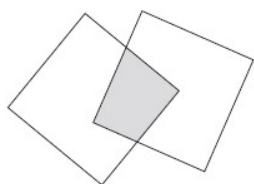
Here are three spheres.



The volume of sphere **Q** is 50% more than the volume of sphere **P**.
 The volume of sphere **R** is 50% more than the volume of sphere **Q**.
 Find the volume of sphere **P** as a fraction of the volume of sphere **R**.

(Total for question = 3 marks)

Q9. NON-CALCULATOR



The diagram shows a shape made by overlapping two identical squares.

The area of the shaded region is 25% of the area of each square.

Work out what fraction of the area of the whole shape is shaded.

(Total for question = 3 marks)

Q10. NON-CALCULATOR

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

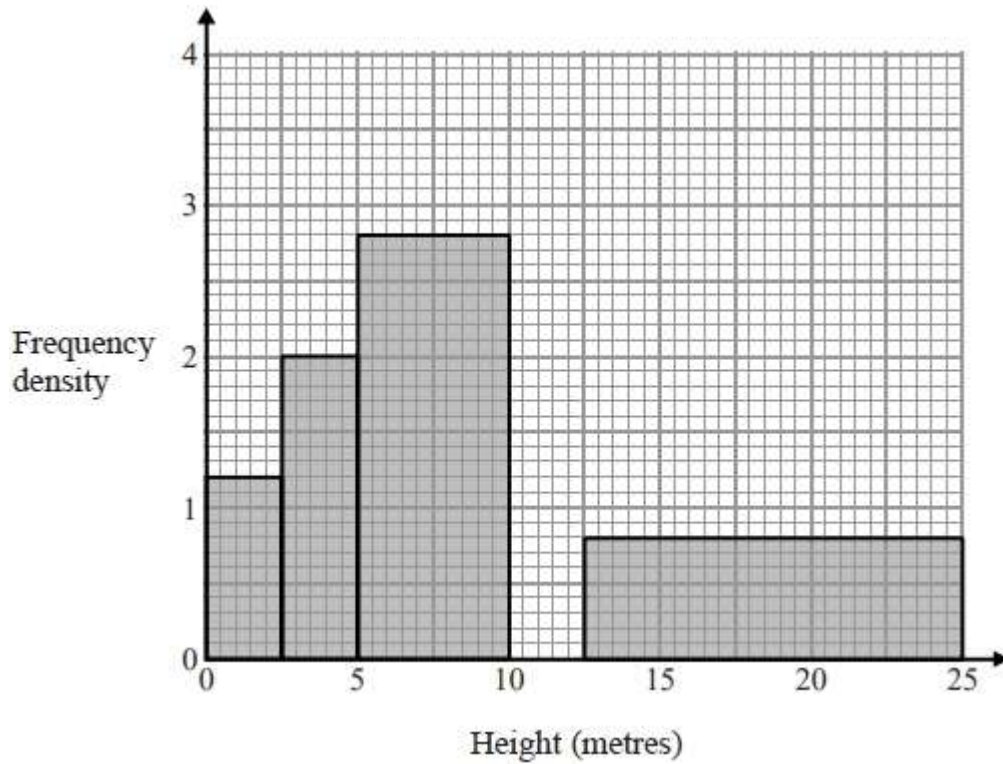
What percentage of all the people in the company are under the age of 25?

..... %

(Total for question = 4 marks)

Q11. NON-CALCULATOR

The histogram gives information about the heights, in metres, of the trees in a park.
The histogram is incomplete.



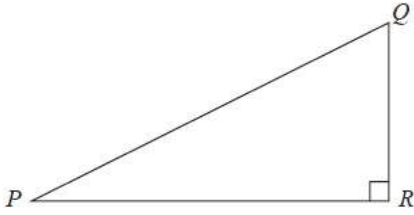
20% of the trees in the park have a height between 10 metres and 12.5 metres.
None of the trees in the park have a height greater than 25 metres.

Complete the histogram.

(Total for question = 3 marks)

Q12. CALCULATOR ALLOWED

Here is triangle PQR .



The length of QR is 60% of the length of PR .

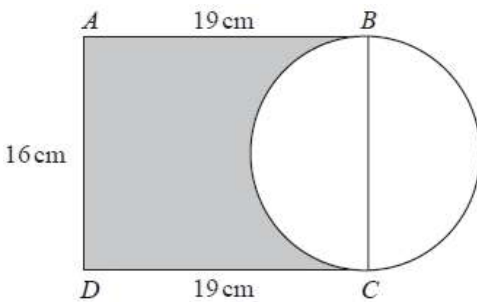
Find the value of $\sin QPR$.

Give your answer correct to 3 significant figures.

.....

(Total for question = 3 marks)

Q13. CALCULATOR ALLOWED



Here is a diagram showing a rectangle, $ABCD$, and a circle.

BC is a diameter of the circle.

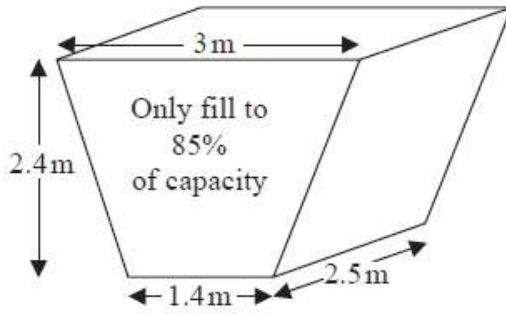
Calculate the percentage of the area of the rectangle that is shaded.
Give your answer correct to 1 decimal place.

.....%

(Total for question is 4 marks)

Q14. CALCULATOR ALLOWED

The diagram shows an oil tank in the shape of a prism.
The cross section of the prism is a trapezium.



The tank is empty.

Oil flows into the tank.

After one minute there are 300 litres of oil in the tank.

Assume that oil continues to flow into the tank at this rate.

- (a) Work out how many **more** minutes it takes for the tank to be 85% full of oil.
(1 m³ = 1000 litres)

..... minutes

(5)

The assumption about the rate of flow of the oil could be wrong.

- (b) Explain how this could affect your answer to part (a).

.....
.....

(1)

(Total for question = 6 marks)

Q15. CALCULATOR ALLOWED

Harley's house has a value of £160 000 correct to 2 significant figures.

(a) (i) Write down the least possible value of the house.

£
(1)

(ii) Write down the greatest possible value of the house.

£
(1)

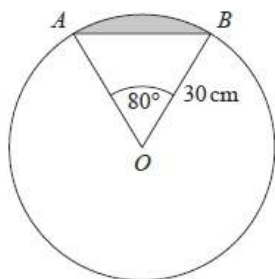
The value of Rita's house increased by 5%.
Her house then had a value of £210 000

(b) Work out the value of Rita's house before the increase.

£
(2)

(Total for question = 4 marks)

Q16. CALCULATOR ALLOWED



AB is a chord of a circle centre O .

The radius of the circle is 30 cm.

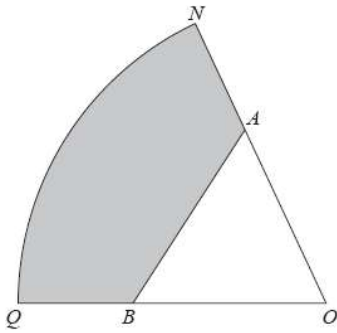
Angle $AOB = 80^\circ$

Work out what percentage of the area of the circle is shaded.

..... %

(Total for question = 5 marks)

Q17. CALCULATOR ALLOWED



ONQ is a sector of a circle with centre O and radius 11 cm.

A is the point on ON and B is the point on OQ such that AOB is an equilateral triangle of side 7 cm.

Calculate the area of the shaded region as a percentage of the area of the sector ONQ .

Give your answer correct to 1 decimal place.

..... %
(Total for question = 5 marks)

Q18. CALCULATOR ALLOWED

On a school trip the ratio of the number of teachers to the number of students is $1 : 15$

The ratio of the number of male students to the number of female students is $7 : 5$

Work out what percentage of all the people on the trip are female students.

Give your answer correct to the nearest whole number.

..... %
(Total for question = 3 marks)

Q19. CALCULATOR ALLOWED

There are 800 students at a school. Each student has either a school dinner or a packed lunch.

31% of the students have packed lunches. 55% of the students are boys. 60% of the boys have school dinners.

How many girls have packed lunches? You must show all your working.

.....
(Total for question = 4 marks)