— CALC J —

GCSE Mathematics · Higher Tier

40 marks · 45 minutes · Calculator

Name ..... **Class** .....

Answer all questions. Show all your working. Diagrams are NOT accurately drawn unless stated.

1 The price of a pair of headphones is £64.68

This price includes VAT at 20%.

Work out the price of the headphones before VAT was added.

£ .....

(Total for Question 1 is 2 marks)

---

2 A sheet of paper is 8.5×10^{-3} cm thick.

A pile of these sheets of paper is 1.2 m tall.

Work out an estimate for the number of sheets of paper in the pile.

Give your answer in standard form, correct to 3 significant figures.

.....

(Total for Question 2 is 2 marks)

---

3 Asha, Ben and Cara share some money.

Ben gets $\frac{3}{4}$ of the amount Asha gets.

Cara gets $\frac{2}{3}$ of the amount Ben gets.

Cara gets £84 less than Asha.

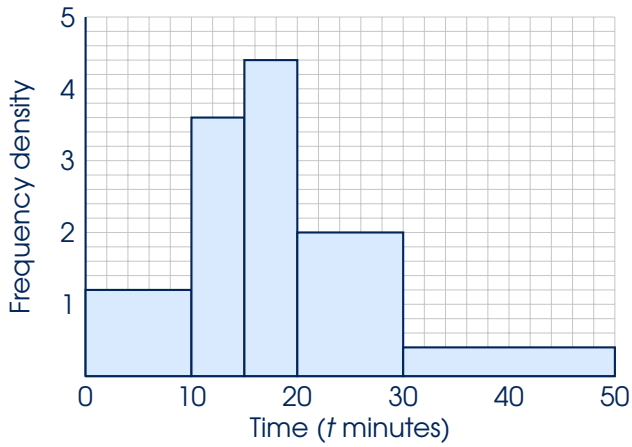
Work out the total amount of money they share.

£ .....

(Total for Question 3 is 3 marks)

---

4 The histogram shows information about the times, *t* minutes, that some customers waited at a call centre.



(a) Work out the total number of customers.

.....

(2)

(b) Lily says,

"Most of the customers waited more than 20 minutes."

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

.....

.....

(1)

(Total for Question 4 is 3 marks)

---

5 At a cinema, all adult tickets cost the same and all child tickets cost the same.
Jo pays £47.10 for 3 adult tickets and 2 child tickets.
Kai pays £80.30 for 4 adult tickets and 5 child tickets.
Lee buys 2 adult tickets and 3 child tickets.
He pays with a £50 note.
How much change should Lee get?

£ .....

(Total for Question 5 is 4 marks)

---

6 Sam invests £4500 in a savings account.
The account pays 3.8% per year compound interest.
Sam says,

"It will take 8 years for my investment to be worth more than £6000"

Is Sam correct? You must show all your working.

(Total for Question 6 is 3 marks)

---

7 *ABC* is a triangle.

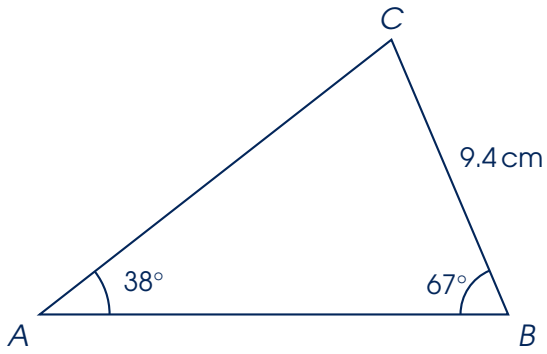


Diagram NOT accurately drawn

Work out the length of *AC*.

Give your answer correct to 3 significant figures.

..... cm

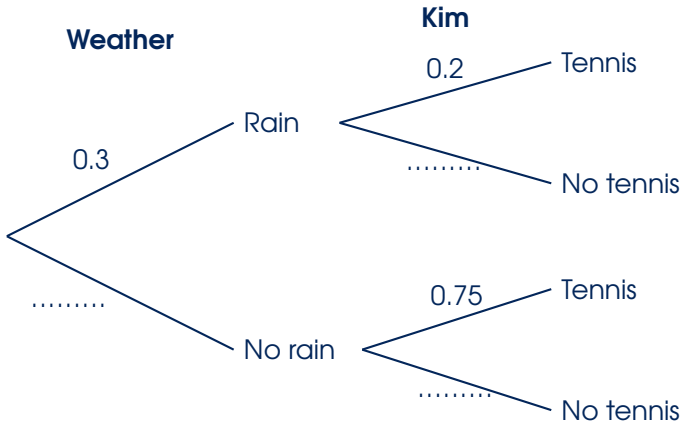
(Total for Question 7 is 3 marks)

8 The probability that it will rain on Saturday is 0.3

If it rains, the probability that Kim plays tennis is 0.2

If it does not rain, the probability that Kim plays tennis is 0.75

(a) Complete the probability tree diagram.



(1)

(b) Kim played tennis on Saturday.

Kim says,

"The probability that it rained on Saturday is less than 0.1"

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

(3)

(Total for Question 8 is 4 marks)

9 The equation $x^3 + 2x - 9 = 0$ has one solution.

Using $x_{n+1} = \sqrt[3]{9 - 2x_n}$ with $x_0 = 2$, find the value of x_3

Give your answer correct to 4 decimal places.

$x_3 =$ .....

(Total for Question 9 is 3 marks)

---

10 PQR is a triangle with area $26\,\text{cm}^2$.

$PQ = 7.2\,\text{cm}$ and $PR = 9.5\,\text{cm}$.

Angle QPR is an acute angle.

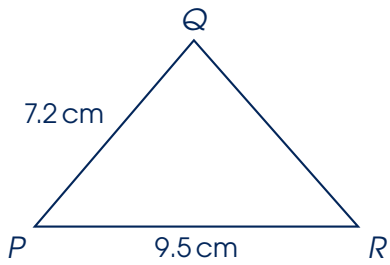


Diagram NOT accurately drawn

Work out the size of angle QPR.

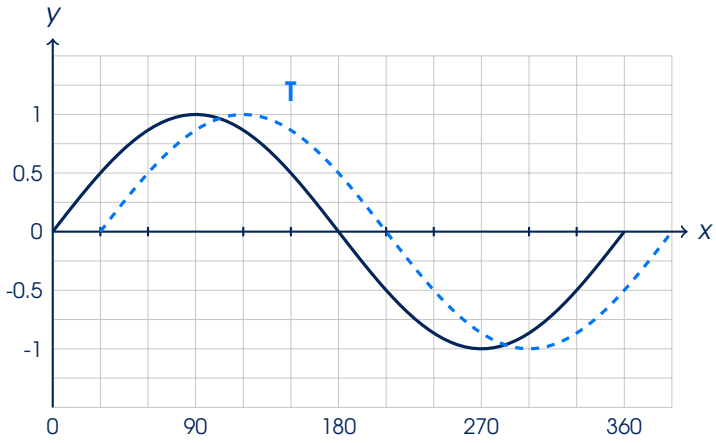
Give your answer correct to 1 decimal place.

..... °

(Total for Question 10 is 2 marks)

---

11 The graph of $y = \sin x$ for $0° \leqslant x \leqslant 360°$ is drawn as a solid line on the grid.
The graph of $y = \sin x$ is translated to give the dashed curve **T**.



(a) Write down an equation of curve **T**.

.....

(1)

(b) Raj says,

"The graph of $y = -\sin x$ is the same as the graph of $y = \sin(x + 180°)$"

Is Raj correct? Give a reason for your answer.

.....

.....

(2)

(Total for Question 11 is 3 marks)

12 Ella swims a distance of 100 m, correct to the nearest metre.
Her time is 64.8 seconds, correct to 1 decimal place.

(a) Write down the upper bound for her time.

..... seconds

(1)

(b) Work out the lower bound for her average speed.
Give your answer correct to 3 significant figures.

..... m/s

(2)

(c) Ella's coach says,

"Your average speed was definitely more than 1.55 m/s."

Is the coach correct? Give a reason for your answer.

.....

.....

(1)

(Total for Question 12 is 4 marks)

13 A solid metal sphere has radius 6 cm.

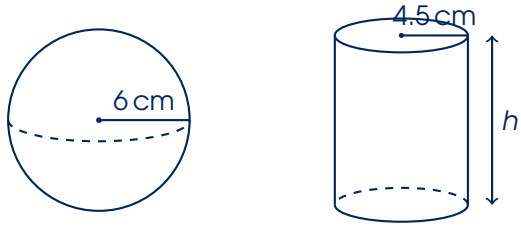


Diagram NOT accurately drawn

The sphere is melted down and all of the metal is made into a solid cylinder.

The cylinder has radius 4.5 cm and height h cm.

Work out the value of h.

Give your answer correct to 3 significant figures.

Volume of a sphere $= \frac{4}{3}\pi r^3$

$h =$ .....

(Total for Question 13 is 4 marks)

TOTAL FOR PAPER IS 40 MARKS