— CALC A —

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 Sam buys 40 phone cases for a total of £150

(a) Sam sells all 40 phone cases for £5.20 each.
Work out Sam's percentage profit.
Give your answer correct to 1 decimal place.

..... %

(2)

(b) Next month Sam buys another 40 phone cases for £150
He wants to make a profit of 60%.
Work out the price he must sell each phone case for.

£ .....

(2)

(Total for Question 1 is 4 marks)

2 Work out $\dfrac{(6.4 \times 10^5)^2}{2.5 \times 10^{-3}}$

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

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(Total for Question 2 is 2 marks)

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3 The table shows the number of students in each year group at a school.

Year group	7	8	9	10	11
Number of students	280	260	250	230	220

The head teacher takes a sample of 80 students, stratified by year group.

Work out the number of Year 9 students in the sample.

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(Total for Question 3 is 2 marks)

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4 Two gyms charge these prices.

FitZone	PowerHouse
£28 joining fee	£85 joining fee
£19.50 per month	£15.70 per month

After how many months will the total cost be the same at both gyms?

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(Total for Question 4 is 3 marks)

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5 Ella invests £6000 in a savings account for 4 years.

The account pays 2.8% compound interest per year.

Ella says,

"I will earn more than £700 interest."

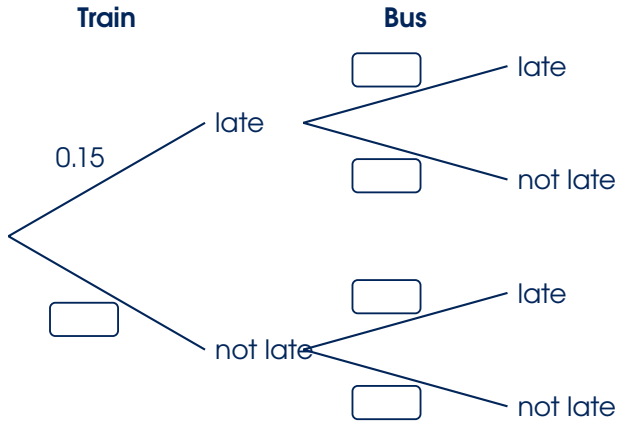
Is Ella correct? You must show how you get your answer.

(Total for Question 5 is 3 marks)

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6 The probability that Leo's train is late is 0.15
The probability that Leo's bus is late is 0.28
These two events are independent.

(a) Complete the probability tree diagram.



(2)

(b) Kim says,

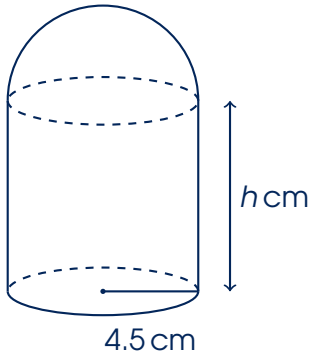
"The probability that exactly one of them is late is $0.15 + 0.28 = 0.43$*"*

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

(2)

(Total for Question 6 is 4 marks)

7 A solid is made from a cylinder and a hemisphere.



The cylinder has radius 4.5 cm and height h cm.

The hemisphere has radius 4.5 cm.

The volume of the solid is 820 cm^3.

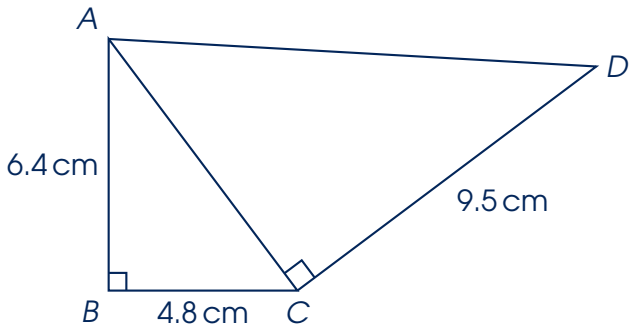
Work out the value of h.

Give your answer correct to 3 significant figures.

$h =$ .....

(Total for Question 7 is 3 marks)

8 *ABC* and *ACD* are right-angled triangles.



AB = 6.4 cm. *BC* = 4.8 cm. *CD* = 9.5 cm.

Angle *ABC* = 90°. Angle *ACD* = 90°.

Work out the size of angle *CAD*.

Give your answer correct to 1 decimal place.

..... °

(Total for Question 8 is 4 marks)

9 **(a)** Show that the equation $x^3 + 2x - 5 = 0$ has a solution between $x = 1$ and $x = 2$

(2)

(b) Using $x_{n+1} = \sqrt[3]{5 - 2x_n}$ with $x_0 = 1.3$

find the values of x_1, x_2 and x_3.

Give your answers correct to 4 decimal places.

$x_1 =$ ..... $x_2 =$ ..... $x_3 =$ .....

(2)

(Total for Question 9 is 4 marks)

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10 Mia runs along a cross-country route.

The length of the route is 400 m, correct to the nearest 10 m.

Mia's time is 52.3 seconds, correct to the nearest 0.1 second.

(a) Write down the upper bound for Mia's time.

..... s

(1)

(b) Mia's coach says,

"Mia's average speed was definitely more than 7.6 m/s."

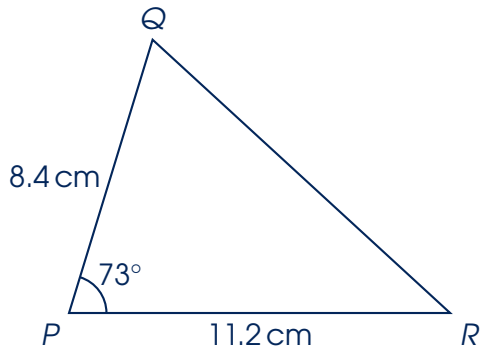
Is the coach correct? You must show how you get your answer.

(3)

(Total for Question 10 is 4 marks)

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11 *PQR* is a triangle.



$PQ = 8.4$ cm. $PR = 11.2$ cm. Angle $QPR = 73°$.

Work out the perimeter of triangle *PQR*.

Give your answer correct to 3 significant figures.

..... cm

(Total for Question 11 is 3 marks)

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12 **(a)** Show that the equation $(2x - 1)^2 = 3x + 5$ can be written as $4x^2 - 7x - 4 = 0$

(1)

(b) Solve $4x^2 - 7x - 4 = 0$

Give your solutions correct to 2 decimal places.

.....

(3)

(Total for Question 12 is 4 marks)

TOTAL FOR PAPER IS 40 MARKS