CALC E

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 A train leaves a station at 09:47 and arrives at its destination at 11:11

The train travels a distance of 154 km.

Work out the average speed of the train in kilometres per hour.

..... km/h

(Total for Question 1 is 2 marks)

---

2 At a college, 45% of the students are male.

$\frac{2}{5}$ of the male students walk to college.

30% of the female students walk to college.

What percentage of all the students at the college walk to college?

..... %

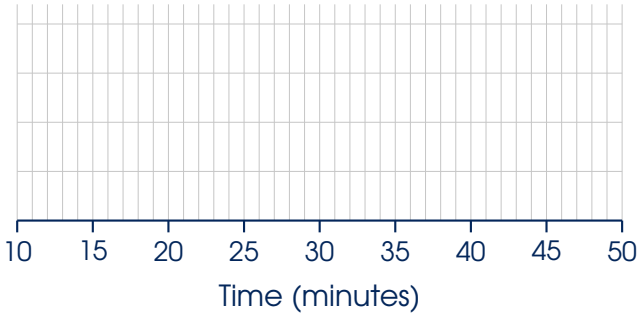
(Total for Question 2 is 3 marks)

---

3 Here are the times, in minutes, that 15 students spent on their homework one evening.

12	15	18	21	22	24	27	30	31	33	35	38	40	44	47

On the grid, draw a box plot for this information.



(Total for Question 3 is 2 marks)

4 Explain why a regular polygon cannot have an interior angle of 155°.
You must show your working.

(Total for Question 4 is 2 marks)

5 **(a)** Expand and simplify $(3x - 2)(2x + 5)$

.....

(2)

(b) Factorise fully $12x^2y - 18xy^3$

.....

(2)

(Total for Question 5 is 4 marks)

---

6 The value of a house increased by 6% in 2023

The value of the house decreased by 4% in 2024

The value of the house increased by 2.5% in 2025

Sam says,

"Over the three years, the value of the house increased by 4.5%"

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

(Total for Question 6 is 3 marks)

---

7 Maya is taking her driving test.

The probability that she passes at her first attempt is 0.62

If she fails at her first attempt, she takes the test a second time.

The probability that she passes at her second attempt is 0.75

Work out the probability that Maya passes her driving test at her first or second attempt.

You may use a tree diagram to help you.

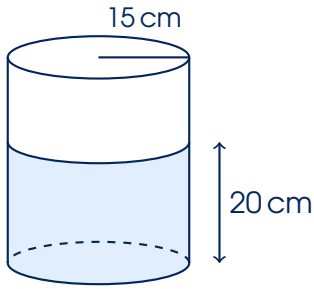
.....

(Total for Question 7 is 3 marks)

---

8 A cylindrical tank has radius 15 cm.

The tank contains water to a depth of 20 cm.



A metal sphere of radius 9 cm is placed in the tank. The sphere is completely covered by the water.

Work out the increase in the depth of the water.

..... cm

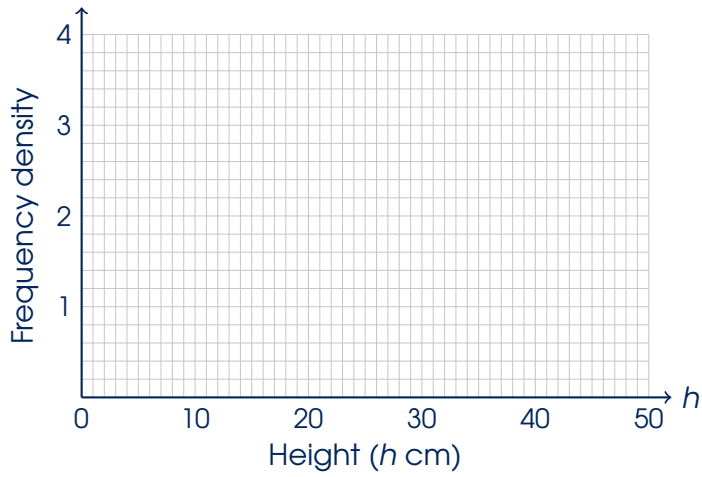
(Total for Question 8 is 3 marks)

---

9 The table gives information about the heights, h cm, of some plants.

Height (h cm)	Frequency
$0 < h \leqslant 10$	8
$10 < h \leqslant 15$	12
$15 < h \leqslant 20$	18
$20 < h \leqslant 30$	14
$30 < h \leqslant 50$	10

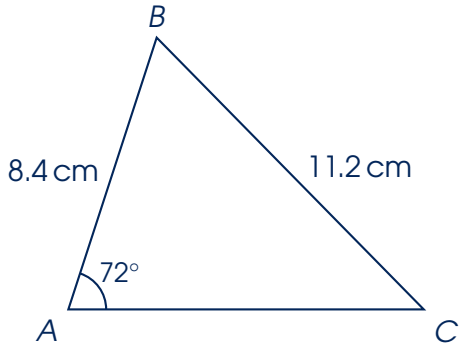
On the grid, draw a histogram for this information.



(Total for Question 9 is 3 marks)

10 ABC is a triangle.

$AB = 8.4\,\text{cm}$, $BC = 11.2\,\text{cm}$ and angle $BAC = 72°$



Work out the size of angle ACB.

Give your answer correct to 1 decimal place.

..... °

(Total for Question 10 is 3 marks)

11 The mass, m grams, of a metal ball bearing is directly proportional to the cube of its radius, r cm.

When $r = 2$, $m = 33.6$

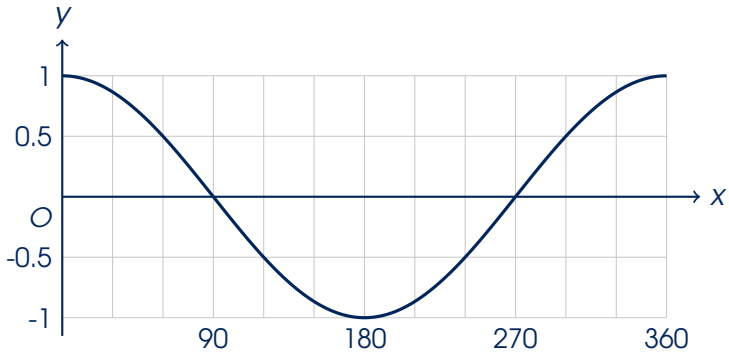
Work out the mass of a ball bearing with radius 3.5 cm.

Give your answer correct to 3 significant figures.

..... g

(Total for Question 11 is 3 marks)

12 The graph of $y = \cos x^\circ$ for $0 \leqslant x \leqslant 360$ is drawn on the grid.



(a) Use your calculator to find the solution of $\cos x^\circ = -0.35$ for $0 \leqslant x \leqslant 180$

Give your answer correct to 1 decimal place.

$x =$ .....

(1)

(b) Use the graph and your answer to part (a) to find all the solutions of $\cos x^\circ = 0.35$ for $0 \leqslant x \leqslant 360$

.....

(2)

(Total for Question 12 is 3 marks)

13 The length of a rectangle is 8.6 cm, correct to 1 decimal place.
The width of the rectangle is 5.2 cm, correct to 1 decimal place.
Tom says,

"The area of the rectangle could be 45.5 cm^2"

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

(Total for Question 13 is 3 marks)

---

14 The diagram shows a rectangle. All measurements are in centimetres.

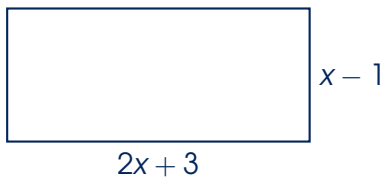


Diagram NOT accurately drawn

The area of the rectangle is 30 cm^2.
Work out the length of the rectangle.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 14 is 3 marks)

TOTAL FOR PAPER IS 40 MARKS