GCSE MATHEMATICS · HIGHER

Targeting Grade 9

Paper 10 · Calculator · 50 minutes · 40 marks

Name ..... **Date** .....

Answer **all** questions. Show all your working: answers without working may not get full marks. Diagrams are **not** accurately drawn. You may use a calculator. If your calculator does not have a π button, take the value of π to be 3.142 unless the question says otherwise.

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1 A loan charges interest at 1.5% per month, compounded monthly.

No repayments are made.

(a) Work out the equivalent percentage interest rate per year.

Give your answer correct to 1 decimal place.

% .....

(3)

(b) After how many whole months will the amount owed first be at least double the amount borrowed?

months .....

(2)

(Total for Question 1 is 5 marks)

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2 The area of a semicircle is 50 cm^2, correct to the nearest whole number.

Work out the lower bound for the perimeter of the semicircle.

Give your answer correct to 2 decimal places.

cm .....

(Total for Question 2 is 4 marks)

3 The table gives information about the times, t minutes, that some people spent in a shop.

Time (t minutes)	Frequency
$0 < t \leqslant 10$	8
$10 < t \leqslant 20$	x
$20 < t \leqslant 30$	12
$30 < t \leqslant 40$	5

An estimate for the mean time is 19 minutes.

(a) Work out the value of x.

$x =$ .....

(3)

(b) One of the people is chosen at random.

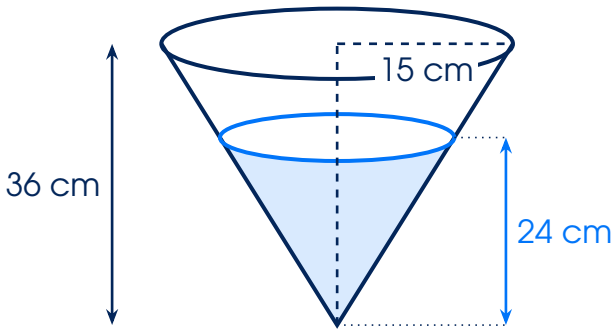
Work out an estimate for the probability that this person spent more than 25 minutes in the shop.

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(2)

(Total for Question 3 is 5 marks)

4



A container is in the shape of a cone with its vertex at the bottom.

The cone has radius 15 cm and height 36 cm.

The container is empty.

Water flows into the container at a constant rate of 120 cm^3 per second.

Work out how long it takes for the depth of the water to reach 24 cm.

Give your answer correct to 3 significant figures.

Volume of a cone $= \frac{1}{3}\pi r^2 h$

seconds .....

(Total for Question 4 is 4 marks)

5 ABC is an isosceles triangle.

$AB = AC = 10$ cm

The area of triangle ABC is 40 cm^2

There are two possible triangles that fit this information.

Work out the two possible lengths of BC.

Give your answers correct to 3 significant figures.

cm .....

cm .....

(Total for Question 5 is 5 marks)

6 A ship sails due east from A to B.

$AB = 8$ km.

From A, the bearing of a lighthouse L is $050°$

From B, the bearing of the lighthouse L is $020°$

(a) Work out the distance BL.

Give your answer correct to 3 significant figures.

km .....

(3)

(b) The ship continues to sail due east from B.

Work out the shortest distance between the ship and the lighthouse.

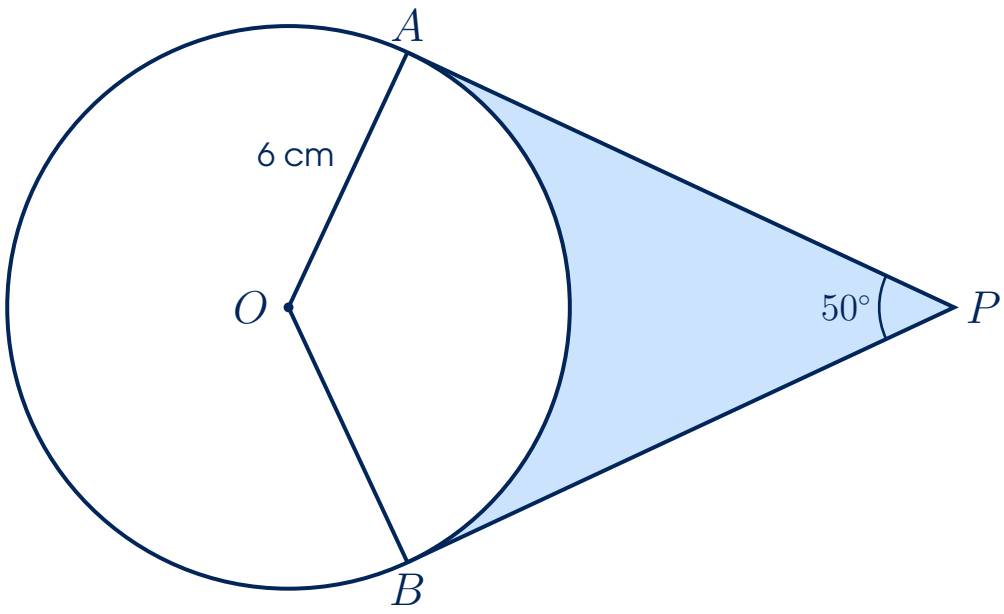
Give your answer correct to 3 significant figures.

km .....

(3)

(Total for Question 6 is 6 marks)

7



A and B are points on a circle, centre O, with radius 6 cm.

PA and PB are tangents to the circle.

Angle $APB = 50°$

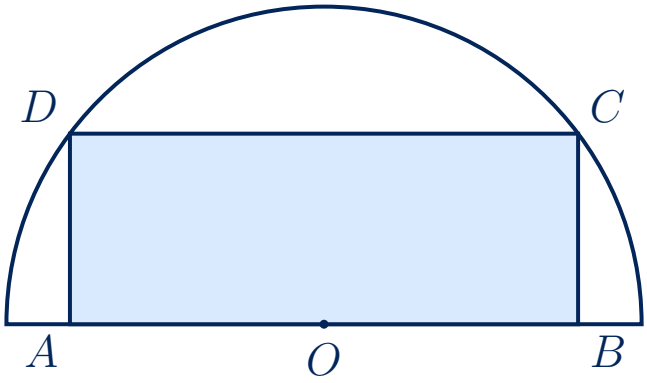
Work out the area of the shaded region.

Give your answer correct to 3 significant figures.

cm^2 .....

(Total for Question 7 is 5 marks)

8



The diagram shows a semicircle, centre O, with radius 10 cm.

$ABCD$ is a rectangle.

A and B lie on the diameter, and C and D lie on the arc of the semicircle.

The area of the rectangle is 96 cm^2

There are two possible rectangles.

Work out the length and width of each rectangle.

You must show all your working.

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(Total for Question 8 is 6 marks)

TOTAL FOR PAPER IS 40 MARKS