

Please write clearly in block capitals.

Centre number

Candidate number

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

INTERNATIONAL AS MATHEMATICS

(9660/MA02) Unit PSM1 Pure Mathematics, Statistics and Mechanics

Thursday 8 January 2026

07:00 UK Time

Time allowed: 1 hour 30 minutes

Materials

- For this paper you must have the OxfordAQA Booklet of Formulae and Statistical Tables (enclosed).
- You may use a graphical calculator.

Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- There are three sections to this paper.
- The maximum mark for this paper is 80. There are 40 marks for **Section A**, 20 marks for **Section B** and 20 marks for **Section C**.

Advice

- Unless stated otherwise, you may quote formulae, without proof, from the booklet.
- Show all necessary working; otherwise marks may be lost.

| For Examiner's Use | |
|--------------------|------|
| Question | Mark |
| 1 | |
| 2 | |
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| TOTAL | |



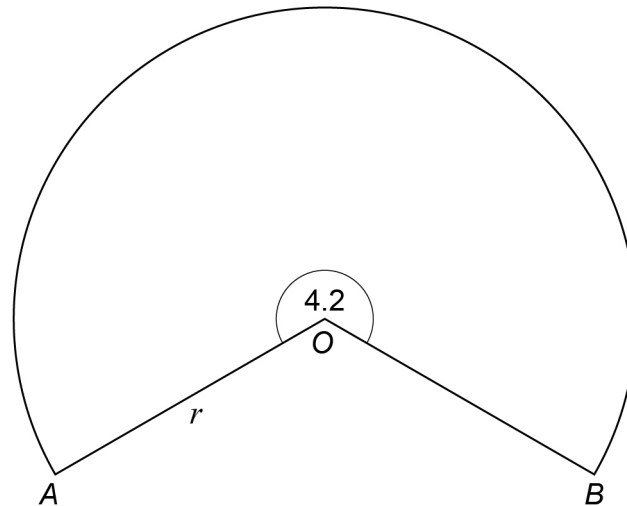
Section A

Pure Mathematics

Answer **all** questions in the spaces provided.

- 1 **Figure 1** shows the sector OAB of a circle with centre O and radius r cm

Figure 1



The reflex angle AOB is 4.2 radians

The perimeter of the sector is 124 cm

Find the area of the sector in cm^2

[4 marks]

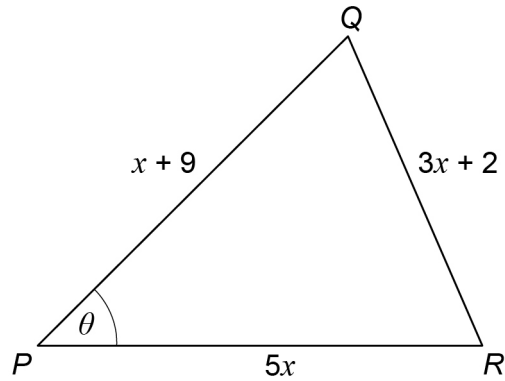
Answer _____

4



- 3 **Figure 2** shows a triangle PQR

Figure 2



The length $PQ = (x + 9)$ cm

The length $PR = 5x$ cm

The length $QR = (3x + 2)$ cm

The **acute** angle $QPR = \theta$ degrees where $\sin \theta = \frac{\sqrt{51}}{10}$

- 3 (a) Use a suitable trigonometric identity to show that $\cos \theta = \frac{7}{10}$

[2 marks]



- 3 (b)** Use the cosine rule to show that the possible values of x satisfy

$$10x^2 - 57x + 77 = 0$$

[3 marks]

- 3 (c)** In the case where x takes its largest value, find the exact area of triangle PQR in cm^2

Give your answer in the form $\frac{a\sqrt{b}}{c}$ where a , b and c are integers.

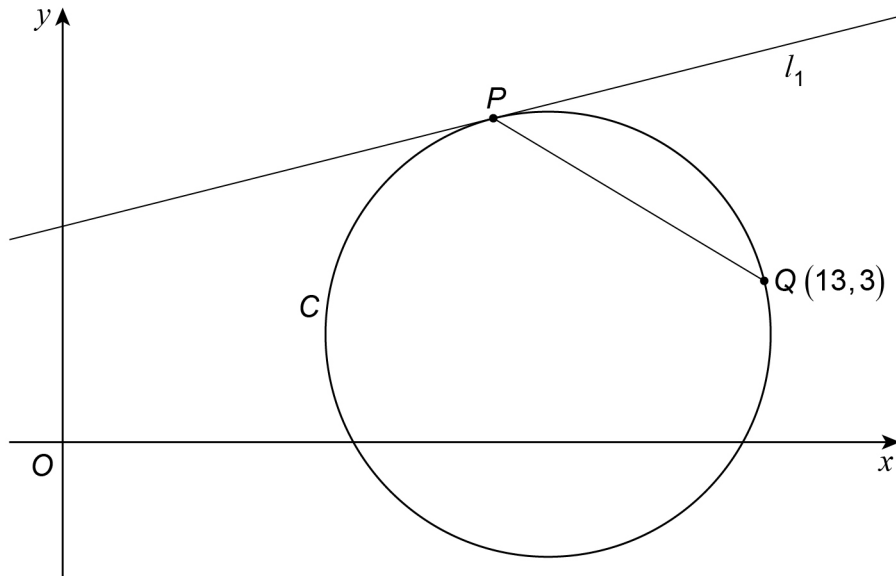
[4 marks]

Answer _____



- 4 The points P and Q lie on a circle C
- The coordinates of Q are $(13,3)$
- The line l_1 is the tangent to C at the point P as shown in **Figure 3**

Figure 3



The equation of C is $x^2 + y^2 = 18x + 4y - 68$

The equation of l_1 is $4y - x = 16$

- 4 (a) Find the coordinates of the centre of C and its exact radius.

[4 marks]

Centre _____ Radius _____



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Section B**Statistics**

Answer **all** questions in the spaces provided.

7 Kelly sells cars.

The probability that she sells at least one car on any given day is 0.35

The event that she sells at least one car on any given day is independent of the event that she sells at least one car on any other day.

A random sample of 14 days is taken.

7 (a) Find the probability that Kelly sells at least one car on exactly 5 of the 14 days.

Give your answer to four decimal places.

[1 mark]

Answer _____

7 (b) Find the probability that Kelly sells at least one car on more than 6 of the 14 days.

Give your answer to three decimal places.

[2 marks]

Answer _____



8 Aten is shooting at a target.

The probability that he hits the target on his first attempt is 0.75

If he does **not** hit the target on his first attempt, he does **not** score any points and he does **not** shoot at the target again.

If he hits the target on his first attempt, he is given a second attempt to shoot at the target.

The probability that he hits the target on his second attempt is 0.45

If he hits the target on his second attempt, he scores 200 points.

If he does **not** hit the target on his second attempt, he scores 100 points.

Aten then does **not** have any more attempts at hitting the target.

The random variable X represents the number of points that Aten scores.

8 (a) Find the probability distribution of X by completing **Figure 4**

[2 marks]

Figure 4

| | | | |
|------------|---|-----|-----|
| x | 0 | 100 | 200 |
| $P(X = x)$ | | | |



8 (b) Find the mean number of points that Aten scores.

[2 marks]

Answer _____

8 (c) The random variable $Y \sim B(100, 0.27)$ represents the number of points scored in a different game.

The random variables X and Y are independent.

Find $E(X - Y)$

[3 marks]

Answer _____

| |
|---------|
| <hr/> 7 |
|---------|

Turn over ►



9 The event A is such that $P(A) = k$ where k is a constant.

The event B is such that $P(B) = 2k$

It is given that $P(A \cup B) = 0.6$

9 (a) In the case where the events A and B are mutually exclusive, find the value of k

[2 marks]

Answer _____

9 (b) In the case where the events A and B are independent, find the value of k

Give your answer to three decimal places.

[3 marks]

Answer _____



Section C**Mechanics**

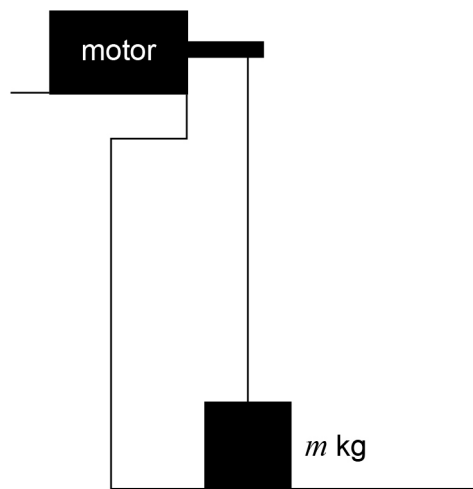
Answer **all** questions in the spaces provided.

10 The acceleration due to gravity, g , should be taken as 9.8 m s^{-2}

A block of mass m kg is initially at rest on a horizontal surface.

The block is attached by a light inextensible rope to a motor vertically above it, as shown in **Figure 5**

Figure 5



The motor produces a tension of magnitude 250 newtons in the rope.

10 (a) In the case where the block remains at rest, find the minimum value of m

[2 marks]

Answer _____



10 (b) In the case where $m = 25$ kg, the block initially moves vertically upwards with an acceleration of magnitude a m s⁻²

10 (b) (i) Show that $a = 0.2$

[1 mark]

10 (b) (ii) The motor raises the block for 3 seconds and then the rope breaks.

The block then moves freely under gravity.

The greatest height above the horizontal surface reached by the bottom of the block is d metres.

Find the value of d

[4 marks]

Answer _____

| |
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|---|



- 11 (b)** Give a reason why the actual value for the coefficient of friction between the coin and the surface may be different to the value you found in **part (a)**.

[1 mark]

6

Turn over for the next question

Turn over ►



12 A particle is travelling along a straight line.

The velocity $v \text{ m s}^{-1}$ of the particle at time t seconds is given by

$$v = t^2(t - k)$$

where k is a positive constant.

12 (a) The acceleration of the particle is 0.25 m s^{-2} when $t = k$

Find the value of k

[2 marks]

$k =$ _____



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