Pearson Edexcel International Advanced Level

Friday 8 May 2026

Morning (Time: 1 hour 30 minutes)

Paper reference **WMA11/01A**

Mathematics

International Advanced Subsidiary/Advanced Level
Pure Mathematics P1
Question Paper

You must have:
Answer book (sent separately).
Do not return this question paper with the answer book.

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Pearson

1. Find

$$\int \left(3x^2 - 2\right)\left(\frac{2}{x^2} + 4\right) \mathrm{d}x$$

giving the answer in simplest form.

(5)

(Total for Question 1 is 5 marks)

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2. **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

A tree was planted.

Exactly 2 years after it was planted, the height of the tree was 2.70 m.

Exactly 7 years after it was planted, the height of the tree was 4.50 m.

Given that t years after it was planted, the height of the tree, H metres, is modelled by the equation

$$H = \frac{at + b}{t + 4}$$

where a and b are constants,

(a) find the complete equation of the model.

(4)

(b) Hence find, according to the model, the height of the tree when it was planted.

(2)

(Total for Question 2 is 6 marks)

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3. **In this question you must show all stages of your working.**

In triangle ABC,

- $AC = 12$ cm
- $AB = 8$ cm
- angle $BCA = 32°$
- angle $CBA = \theta°$

(a) Find both possible values for θ, giving each answer to 2 decimal places.

(3)

Given that $\theta > 90$

(b) find, to 3 significant figures, the length of BC,

(2)

(c) find, to 3 significant figures, the area of the triangle.

(2)

(Total for Question 3 is 7 marks)

4. **In this question you must show all stages of your working.**
Solutions relying on calculator technology are not acceptable.

(i) Using the laws of indices, solve

$$2^{3p-5} = \frac{1}{16}\sqrt{128}$$

(3)

(ii) Find the real roots of the equation

$$\left(x^2 - 2\right)^2 = x^2 + 18$$

(4)

(Total for Question 4 is 7 marks)

5.

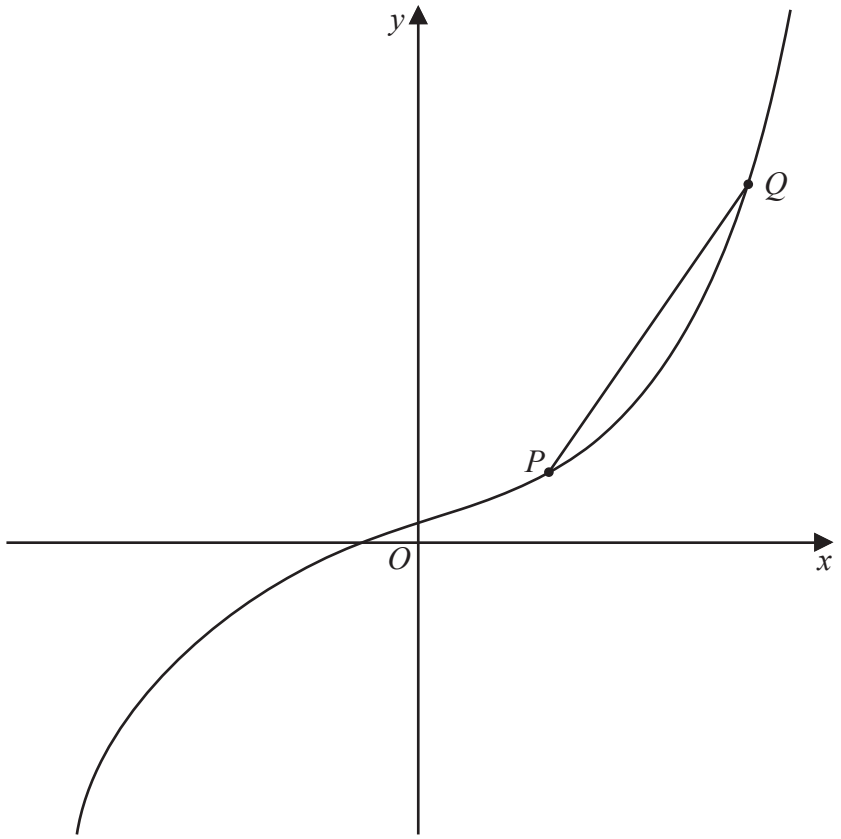

Figure 1

In this question you must show detailed reasoning.
Solutions relying on calculator technology are not acceptable.

Figure 1 shows a sketch of part of the curve with equation $y = x^3 + 2x + 3$

The point $P(2, 15)$ lies on the curve.

(a) Use calculus to find the gradient of the tangent to the curve at P.

(2)

The point Q with x coordinate $2 + h$ where $h > 0$ also lies on the curve.

(b) Find, in terms of h, the gradient of the straight line PQ.
Give the answer in simplest form.

(4)

(c) Explain briefly the relationship between the answer to part (b) and the answer to part (a).

(1)

(Total for Question 5 is 7 marks)

6.

Diagrams Not to scale

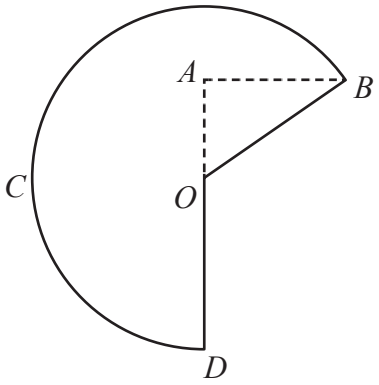

Figure 2

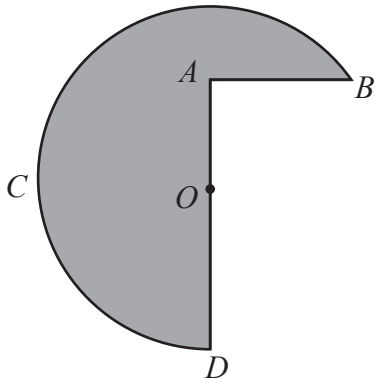

Figure 3

In this question you must show all stages of your working.

Figure 2 shows

- a sector $DOBCD$ of a circle with centre O
- a right-angled triangle OAB with the right angle at A

A company's logo, shown shaded in Figure 3, is formed when the right-angled triangle is removed from the sector of the circle.

Given that

- $OB = OD = 9$ cm
- $AB = 7.3$ cm

(a) find the size of angle BOA, in radians, to 3 decimal places,

(2)

(b) find the area of the logo, in cm^2, to 3 significant figures,

(3)

(c) find the perimeter of the logo, in cm, to one decimal place.

(3)

(Total for Question 6 is 8 marks)

7. The curve C has equation $y = \mathrm{f}(x)$, $x > 0$

The point P with x coordinate 4 lies on C.

Given that

- $\mathrm{f}'(x) = \dfrac{k - \sqrt{x}}{2x^2}$ where k is a constant
- the normal to C at P has equation $y + 2x - 5 = 0$

(a) (i) show that $k = 18$

(ii) find the equation of the tangent to C at P. Give the answer in the form $y = mx + c$, where m and c are constants.

(6)

(b) Find an expression for $\mathrm{f}(x)$ in terms of x, giving the answer in simplest form.

(5)

(Total for Question 7 is 11 marks)

8.

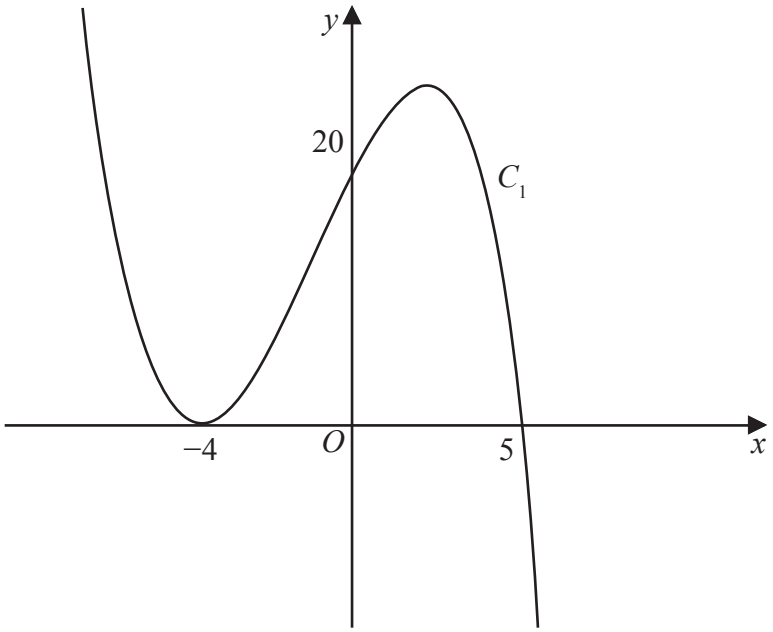

Figure 4

In this question you must show detailed reasoning.
Solutions relying on calculator technology are not acceptable.

Figure 4 shows the curve C_1 with equation $y = \mathrm{f}(x)$ where $\mathrm{f}(x)$ is a cubic function in x.

The curve C_1

- cuts the x-axis at 5 and the y-axis at 20
- touches the x-axis at -4

as shown in Figure 4.

(a) Deduce the range of values of x for which $\mathrm{f}(x) \leqslant 0$

(2)

(b) Find an expression for $\mathrm{f}(x)$ in terms of x.
Give the answer in a fully factorised form.

(3)

The curve C_2 has equation $y = 3x(x - 5)$

(c) Find the exact x coordinates of all points of intersection of C_1 and C_2

(4)

(Total for Question 8 is 9 marks)

9.

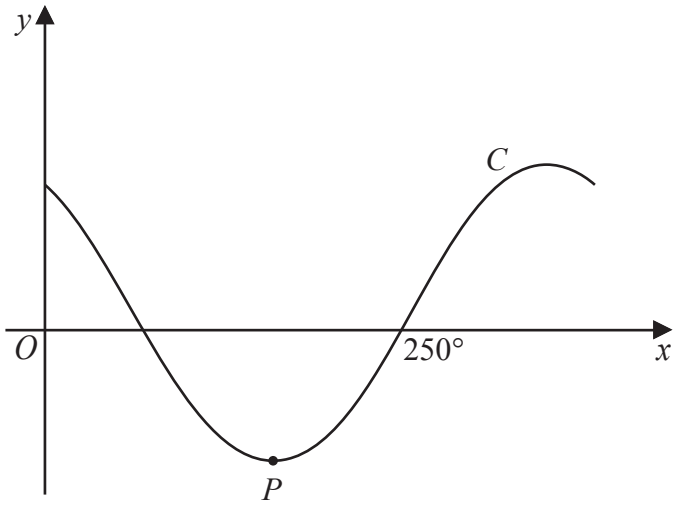

Figure 5

Figure 5 shows a sketch of the curve C with equation

$$y = \cos(x + k°) \qquad 0 \leqslant x < 360°$$

where x is measured in degrees and k is a constant.

The curve C

- cuts the x-axis at $250°$
- has a minimum point at P

as shown in Figure 5.

(a) State the value of k.

(1)

(b) State the coordinates of P.

(1)

(c) Solve the equation

$$\cos(x + k°) = 0$$

for values of x in the range $3600° \leqslant x < 3960°$

(2)

(d) Find the coordinates of the point to which P is mapped when C is transformed to the curve with equation

(i) $y = -4\cos(x + k°)$

(ii) $y = \cos(x - 3k°)$

(2)

(Total for Question 9 is 6 marks)

10.

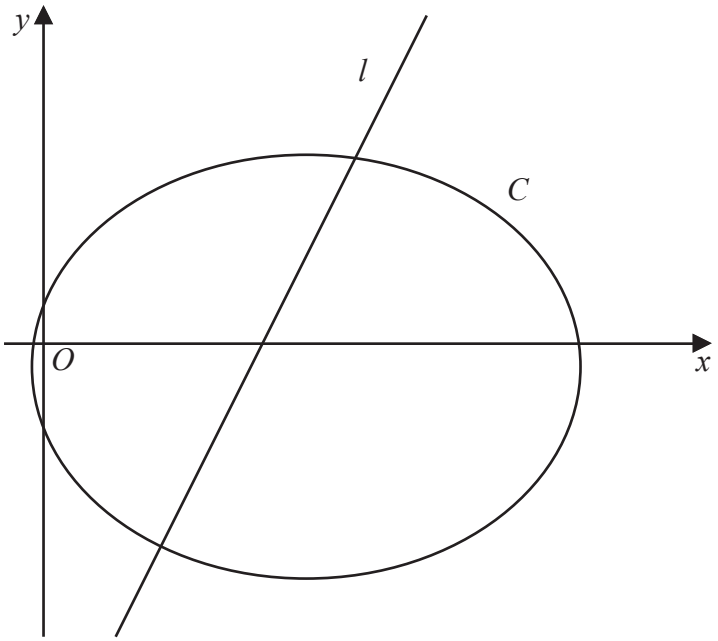

Figure 6

In this question you must show all stages of your working.
Solutions relying entirely on calculator technology are not acceptable.

Figure 6 shows a sketch of

- the curve C with equation $x^2 + 2y^2 - 6x + y - 1 = 0$
- the line l with equation $y = 2x + k$ where k is a constant

Given that k can vary,

(a) show that when l touches C

$$2k^2 + 25k - 13 = 0$$

(4)

Given further that

- $k < 0$
- l touches C at the point P

(b) find the exact coordinates of P

(5)

(Total for Question 10 is 9 marks)

TOTAL FOR PAPER IS 75 MARKS

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