

Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				

**Pearson Edexcel International Advanced Level**

**Tuesday 9 January 2024**

Morning (Time: 1 hour 30 minutes)

Paper reference **WMA11/01**

**Mathematics**

**International Advanced Subsidiary/Advanced Level**

**Pure Mathematics P1**

**You must have:**  
Mathematical Formulae and Statistical Tables (Yellow), calculator

Total Marks

**Candidates may use any calculator permitted by Pearson regulations. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.**

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Inexact answers should be given to three significant figures unless otherwise stated.

### Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 10 questions in this question paper. The total mark for this paper is 75.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

Turn over ►

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1. Find

$$\int (2x - 5)(3x + 2)(2x + 5)dx$$

writing your answer in simplest form.

(5)



DO NOT WRITE IN THIS AREA

Question 1 continued

Lined area for writing answers.

(Total for Question 1 is 5 marks)



2. The triangle  $ABC$  is such that

- $AB = 15 \text{ cm}$
- $AC = 25 \text{ cm}$
- $\text{angle } BAC = \theta^\circ$
- $\text{area triangle } ABC = 100 \text{ cm}^2$

(a) Find the value of  $\sin \theta^\circ$

(2)

Given that  $\theta > 90$

(b) find the length of  $BC$ , in cm, to 3 significant figures.

(3)



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Question 2 continued

Lined area for writing the answer to Question 2.

(Total for Question 2 is 5 marks)



3. The curve  $C$  has equation

$$y = \frac{5x^3 - 8}{2x^2} \quad x > 0$$

(a) Find  $\frac{dy}{dx}$  writing your answer in simplest form.

(4)

The point  $P(2, 4)$  lies on  $C$ .

(b) Find an equation for the tangent to  $C$  at  $P$  writing your answer in the form  $ax + by + c = 0$ , where  $a$ ,  $b$  and  $c$  are integers.

(3)



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Question 3 continued

Lined area for writing answers.

(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.

(a) By substituting  $p = 2^x$ , show that the equation

$$2 \times 4^x - 2^{x+3} = 17 \times 2^{x-1} - 4$$

can be written in the form

$$4p^2 - 33p + 8 = 0$$

(3)

(b) Hence solve

$$2 \times 4^x - 2^{x+3} = 17 \times 2^{x-1} - 4$$

(3)





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Question 4 continued

Lined area for writing answers.

(Total for Question 4 is 6 marks)



5.

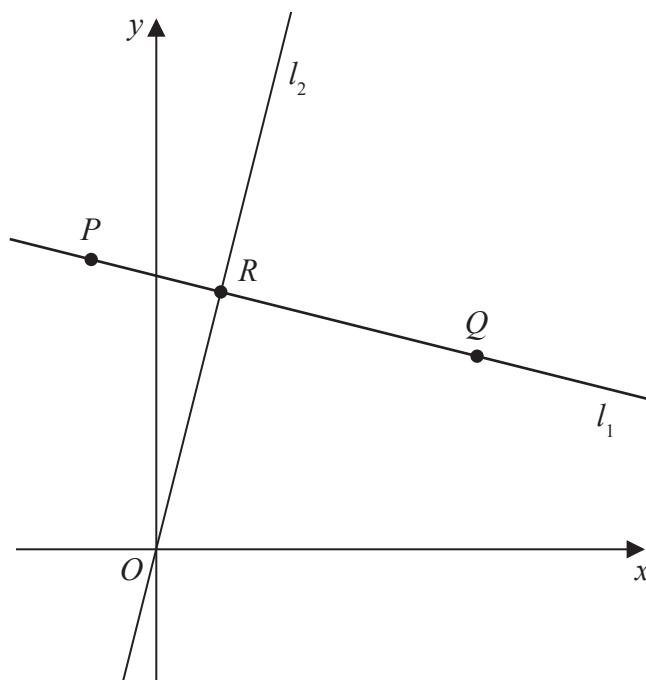


Figure 1

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

**Solutions relying on calculator technology are not acceptable.**

The straight line  $l_1$ , shown in Figure 1, passes through the points  $P(-2, 9)$  and  $Q(10, 6)$ .

- (a) Find the equation of  $l_1$ , giving your answer in the form  $y = mx + c$ , where  $m$  and  $c$  are constants to be found.

(3)

The straight line  $l_2$  passes through the origin  $O$  and is perpendicular to  $l_1$ .

The lines  $l_1$  and  $l_2$  meet at the point  $R$  as shown in Figure 1.

- (b) Find the coordinates of  $R$ .

(4)

- (c) Find the exact area of triangle  $OPQ$ .

(3)

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Question 5 continued

Lined area for writing the answer to Question 5.



Question 5 continued

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Question 5 continued

Lined area for writing answers.

(Total for Question 5 is 10 marks)



6.

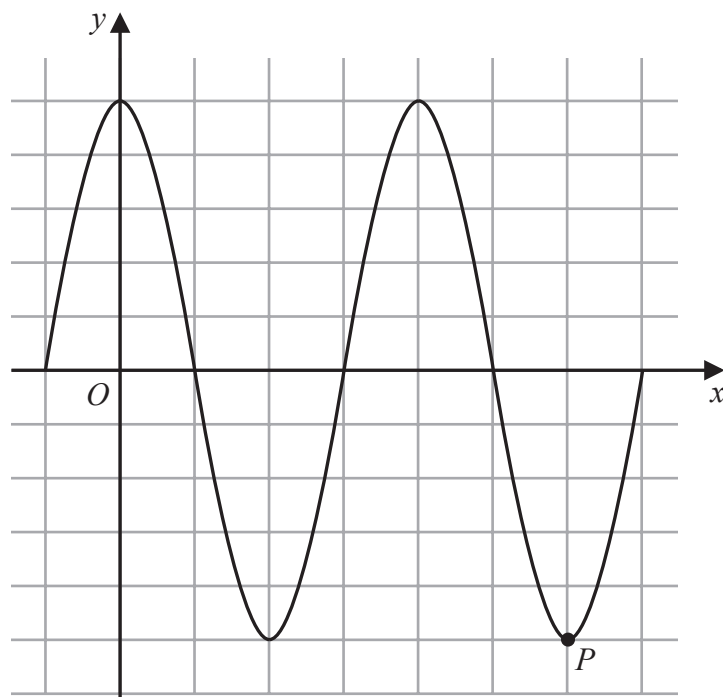


Figure 2

Figure 2 shows a plot of part of the curve  $C_1$  with equation

$$y = 5 \cos x$$

with  $x$  being measured in degrees.

The point  $P$ , shown in Figure 2, is a minimum point on  $C_1$

(a) State the coordinates of  $P$

(2)

The point  $Q$  lies on a different curve  $C_2$

Given that point  $Q$

- is a maximum point on the curve
- is the maximum point with the **smallest**  $x$  coordinate,  $x > 0$

(b) find the coordinates of  $Q$  when

(i)  $C_2$  has equation  $y = 5 \cos x - 2$

(ii)  $C_2$  has equation  $y = -5 \cos x$

(4)



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Question 6 continued

Lined area for writing answers.

(Total for Question 6 is 6 marks)



7. (a) Sketch the graph of the curve  $C$  with equation

$$y = \frac{4}{x - k}$$

where  $k$  is a positive constant.

Show on your sketch

- the coordinates of any points where  $C$  cuts the coordinate axes
- the equation of the vertical asymptote to  $C$

(4)

Given that the straight line with equation  $y = 9 - x$  does not cross or touch  $C$

- (b) find the range of values of  $k$ .

(5)





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Question 7 continued

Lined area for writing answers.

(Total for Question 7 is 9 marks)



8.

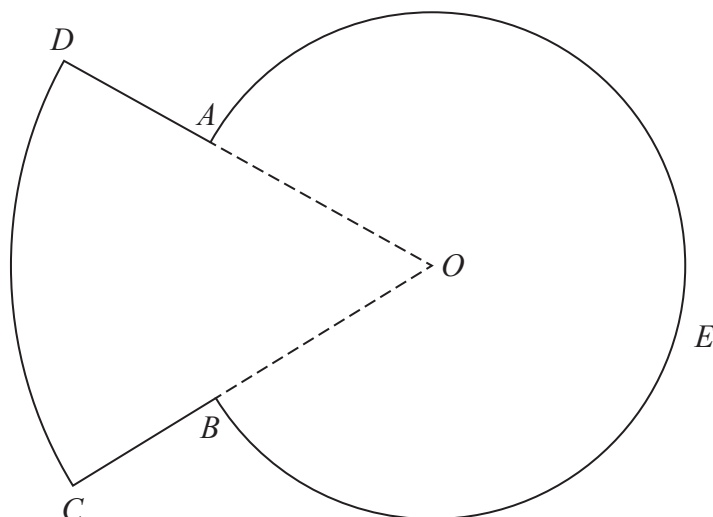


Figure 3

Figure 3 shows a sketch of the plan view of a platform.

The plan view of the platform consists of a sector  $DOC$  of a circle centre  $O$  joined to a sector  $AOBEA$  of a different circle, also with centre  $O$ .

Given that

- angle  $AOB = 0.8$  radians
- arc length  $CD = 9$  m
- $DA:AO = 3:5$

(a) show that  $AO = 7.03$  m to 3 significant figures.

(3)

(b) Find the perimeter of the platform, in m, to 3 significant figures.

(3)

(c) Find the total area of the platform, giving your answer in  $\text{m}^2$  to the nearest whole number.

(3)

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Question 8 continued

Lined area for writing the answer to Question 8.



Question 8 continued

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Question 8 continued

Handwriting practice area with horizontal lines.

(Total for Question 8 is 9 marks)



9. The curve  $C_1$  has equation  $y = f(x)$ .

Given that

- $f(x)$  is a quadratic expression
- $C_1$  has a maximum turning point at  $(2, 20)$
- $C_1$  passes through the origin

(a) sketch a graph of  $C_1$  showing the coordinates of any points where  $C_1$  cuts the coordinate axes,

(2)

(b) find an expression for  $f(x)$ .

(3)

The curve  $C_2$  has equation  $y = x(x^2 - 4)$

Curve  $C_1$  and  $C_2$  meet at the origin, and at the points  $P$  and  $Q$

Given that the  $x$  coordinate of the point  $P$  is negative,

(c) using algebra and showing all stages of your working, find the coordinates of  $P$

(5)



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Question 9 continued

Lined area for writing the answer to Question 9.



Question 9 continued

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Question 9 continued

Lined area for writing the answer to Question 9.

(Total for Question 9 is 10 marks)





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Question 10 continued

Lined area for writing the answer to Question 10.



**Question 10 continued**

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**(Total for Question 10 is 8 marks)**

**TOTAL FOR PAPER IS 75 MARKS**

