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**Pearson Edexcel International Advanced Level**

**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.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **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.

Turn over ►

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1. Find

$$\int \left( \frac{8x^3}{5} - \frac{2}{3x^4} - 1 \right) dx$$

giving each term in simplest form.

(4)

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Question 1 continued

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Q1

(Total 4 marks)

Mark box for Q1.



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Question 2 continued

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Handwriting practice lines for the answer.

(Total 6 marks)

Q2



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

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

$$f(x) = (x + \sqrt{2})^2 + (3x - 5\sqrt{8})^2$$

(3)

$$\sqrt{3}(4y - 3\sqrt{3}) = 5y + \sqrt{3}$$

(4)

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Question 3 continued

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Question 3 continued

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Question 3 continued

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Q3

(Total 7 marks)



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

Figure 1 shows a line  $l$  with equation  $x + y = 6$  and a curve  $C$  with equation  $y = 6x - 2x^2 + 1$

(a) Find, using algebra, the coordinates of  $P$  and the coordinates of  $Q$ . (4)

(b) Use inequalities to define the region  $R$ . (3)

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Question 4 continued

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Q4

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**Question 5 continued**



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Q5

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Question 6 continued

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Question 6 continued

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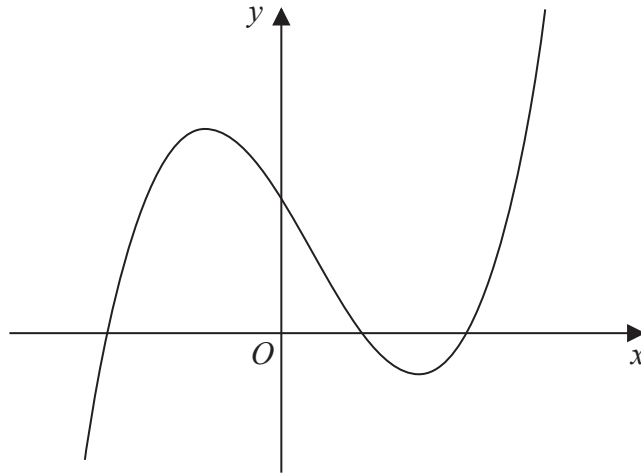
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Q6

(Total 11 marks)



7.



**Figure 3**

Figure 3 shows a sketch of part of the curve with equation  $y = f(x)$ , where

$$f(x) = (x + 4)(x - 2)(2x - 9)$$

Given that the curve with equation  $y = f(x) - p$  passes through the point with coordinates  $(0, 50)$

- (a) find the value of the constant  $p$ . (2)

Given that the curve with equation  $y = f(x + q)$  passes through the origin,

- (b) write down the possible values of the constant  $q$ . (2)

- (c) Find  $f'(x)$ . (4)

- (d) Hence find the range of values of  $x$  for which the gradient of the curve with equation  $y = f(x)$  is less than  $-18$  (3)

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**Question 7 continued**



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Question 7 continued

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(Total 11 marks)

Q7



$$2x - 5y + 7 = 0$$

- (1)

- the point  $A$  has coordinates  $(6, -2)$
- the line  $l_2$  passes through  $A$  and is perpendicular to  $l_1$

- (3)

(c) Using algebra and showing all your working, find the coordinates of  $M$ .

(3)

(d) find the coordinates of the point  $C$ .

(2)

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**Question 8 continued**



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Q8

(Total 9 marks)



A graph of a periodic function  $y = f(x)$  is shown on a Cartesian coordinate system. The origin is labeled  $O$ . The x-axis is labeled  $x$  and the y-axis is labeled  $y$ . The function has a minimum point  $P$  on the y-axis and a maximum point  $Q$ . The function is periodic with period  $2\pi$ .

Figure 4 shows part of the curve with equation

where  $A$  is a constant.

(a) Write down the value of  $A$ . **(1)**

(b) Find the coordinates of  $Q$ . (3)

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(Total 4 marks)

Q9



10. The curve  $C$  has equation

$$y = \frac{1}{x^2} - 9$$

(a) Sketch the graph of  $C$ .

On your sketch

- show the coordinates of any points of intersection with the coordinate axes
- state clearly the equations of any asymptotes

(4)

The curve  $D$  has equation  $y = kx^2$  where  $k$  is a constant.

Given that  $C$  meets  $D$  at 4 distinct points,

(b) find the range of possible values for  $k$ .

(5)



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Question 10 continued

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Q10

(Total 9 marks)

END

TOTAL FOR PAPER: 75 MARKS

