

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

--	--	--	--	--

--	--	--	--

## 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 9 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 ►

P72137A

©2022 Pearson Education Ltd.

B:1/1/1/1/



Pearson





2. Given that

$$(x - 5)(2x + 1)(x + 3) \equiv ax^3 + bx^2 - 32x - 15$$

where  $a$  and  $b$  are constants,

(a) find the value of  $a$  and the value of  $b$ .

(2)

(b) Hence find

$$\int \frac{(x - 5)(2x + 1)(x + 3)}{5\sqrt{x}} dx$$

writing each term in simplest form.

(5)





3. The share price of a company is monitored.

Exactly 3 years after monitoring began, the share price was £1.05

Exactly 5 years after monitoring began, the share price was £1.65

The share price, £ $V$ , of the company is modelled by the equation

$$V = pt + q$$

where  $t$  is the number of years after monitoring began and  $p$  and  $q$  are constants.

(a) Find the value of  $p$  and the value of  $q$ .

(3)

Exactly  $T$  years after monitoring began, the share price was £2.50

(b) Find the value of  $T$ , according to the model, giving your answer to one decimal place.

(2)





4.

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

$$f(x) = x^2(2x + 1) - 15x$$

(a) Solve

$$f(x) = 0 \tag{4}$$

(b) Hence solve

$$y^{\frac{4}{3}}\left(2y^{\frac{2}{3}} + 1\right) - 15y^{\frac{2}{3}} = 0 \quad y > 0$$

giving your answer in simplified surd form.

(2)











**Question 5 continued**

Handwriting practice area with 25 horizontal lines.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Question 5 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Lined writing area for the answer.

(Total for Question 5 is 9 marks)



P 7 2 1 3 7 A 0 1 3 2 8

6. (a) Given that  $k$  is a positive constant such that  $0 < k < 4$  sketch, on **separate axes**, the graphs of

(i)  $y = (2x - k)(x + 4)^2$

(ii)  $y = \frac{k}{x^2}$

showing the coordinates of any points where the graphs cross or meet the coordinate axes, leaving coordinates in terms of  $k$ , where appropriate.

(5)

- (b) State, with a reason, the number of roots of the equation

$$(2x - k)(x + 4)^2 = \frac{k}{x^2}$$

(1)



**Question 6 continued**

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**(Total for Question 6 is 6 marks)**



P 7 2 1 3 7 A 0 1 5 2 8

7.

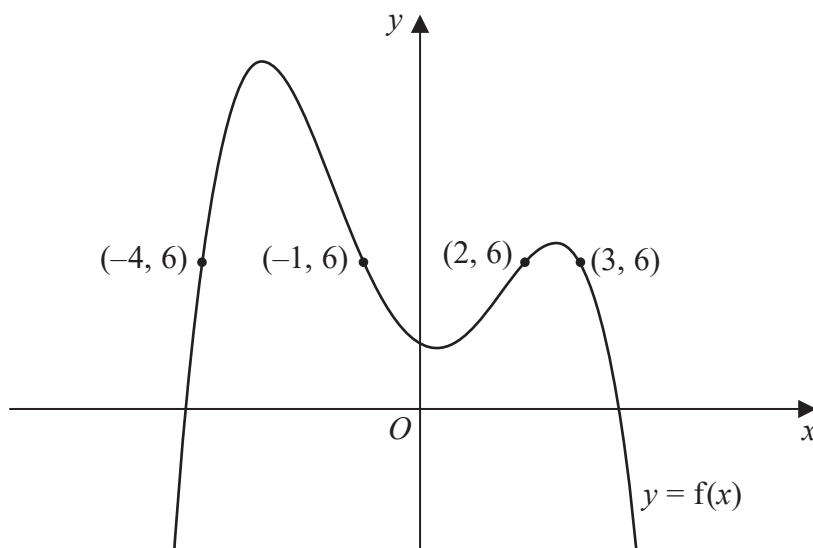


Figure 1

Figure 1 shows the curve with equation  $y = f(x)$ .

The points  $P(-4, 6)$ ,  $Q(-1, 6)$ ,  $R(2, 6)$  and  $S(3, 6)$  lie on the curve.

(a) Using Figure 1, find the range of values of  $x$  for which

$$f(x) < 6 \quad (3)$$

(b) State the largest solution of the equation

$$f(2x) = 6 \quad (1)$$

(c) (i) Sketch the curve with equation  $y = f(-x)$ .

On your sketch, state the coordinates of the points to which  $P$ ,  $Q$ ,  $R$  and  $S$  are transformed.

(ii) Hence find the set of values of  $x$  for which

$$f(-x) \geq 6 \text{ and } x < 0 \quad (4)$$

---



---



---



---



---



---



---



---





DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

### Question 7 continued

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



**Question 7 continued**

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



**Question 7 continued**

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

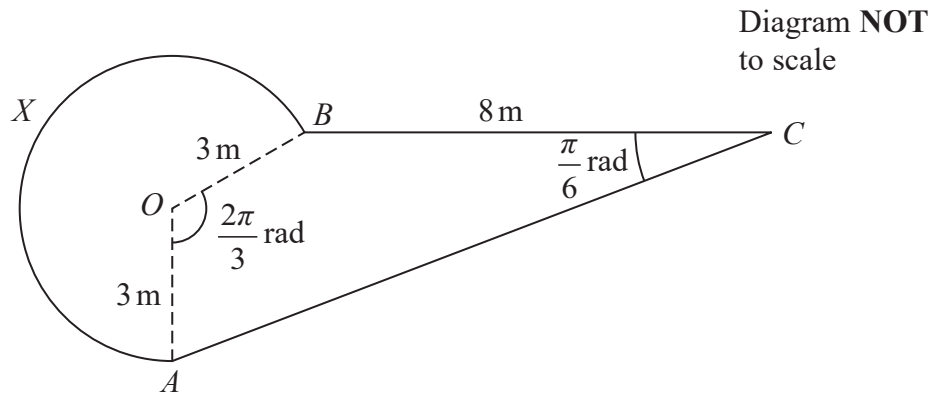
Handwritten answer area consisting of horizontal lines.

(Total for Question 7 is 8 marks)



P 7 2 1 3 7 A 0 1 9 2 8

8.



**Figure 2**

Figure 2 shows the plan view of a design for a pond.

The design consists of a sector  $AOBX$  of a circle centre  $O$  joined to a quadrilateral  $AOBC$ .

- $BC = 8$  m
- $OA = OB = 3$  m
- angle  $AOB$  is  $\frac{2\pi}{3}$  radians
- angle  $BCA$  is  $\frac{\pi}{6}$  radians

(a) Calculate (i) the exact area of the sector  $AOBX$ ,

(ii) the exact perimeter of the sector  $AOBX$ .

(5)

(b) Calculate the exact area of the triangle  $AOB$ .

(2)

(c) Show that the length  $AB$  is  $3\sqrt{3}$  m.

(2)

(d) Find the total surface area of the pond. Give your answer in  $\text{m}^2$  correct to 2 significant figures.

(5)

---

---

---

---

---

---

---

---

---

---

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



**Question 8 continued**

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Lined writing area for the answer to Question 8.



P 7 2 1 3 7 A 0 2 1 2 8





9.

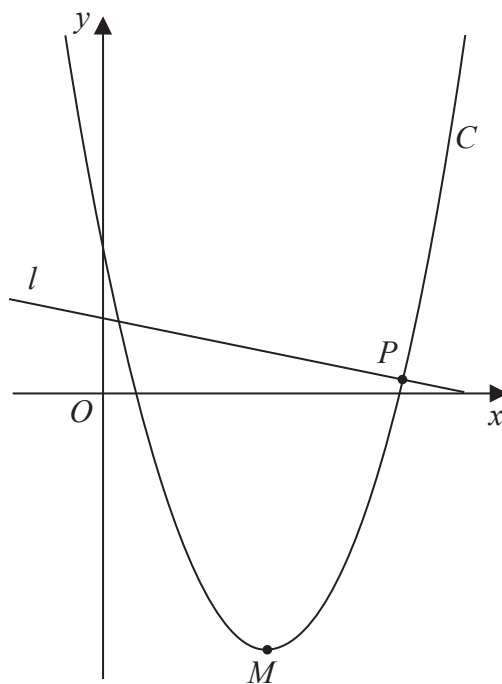


Figure 3

Figure 3 shows a sketch of the curve  $C$  with equation

$$y = \frac{1}{2}x^2 - 10x + 22$$

- (a) Write  $\frac{1}{2}x^2 - 10x + 22$  in the form

$$a(x + b)^2 + c$$

where  $a$ ,  $b$  and  $c$  are constants to be found.

(3)

The point  $M$  is the minimum turning point of  $C$ , as shown in Figure 3.

- (b) Deduce the coordinates of  $M$

(2)

The line  $l$  is the normal to  $C$  at the point  $P$ , as shown in Figure 3.

Given that  $l$  has equation  $y = k - \frac{1}{8}x$ , where  $k$  is a constant,

- (c) (i) find the coordinates of  $P$

(ii) find the value of  $k$

(6)

Question 9 continues on the next page





Question 9 continued

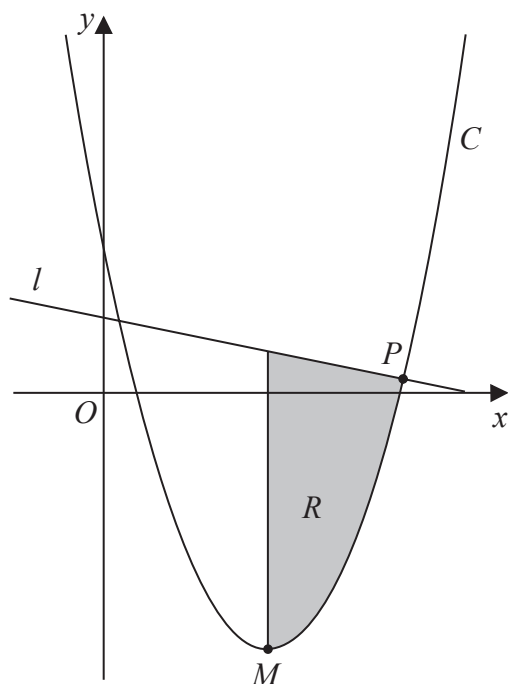


Figure 4

Figure 4 is a copy of Figure 3. The finite region  $R$ , shown shaded in Figure 4, is bounded by  $l$ ,  $C$  and the line through  $M$  parallel to the  $y$ -axis.

(d) Identify the inequalities that define  $R$ .

(3)

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



P 7 2 1 3 7 A 0 2 5 2 8

Question 9 continued

Lined writing area for the answer to Question 9.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



P 7 2 1 3 7 A 0 2 6 2 8





