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Candidate surname					Other names				
Centre Number					Candidate Number				
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Pearson Edexcel International Advanced Level

Time 1 hour 30 minutes

Paper

reference

WMA13/01

Mathematics International Advanced Level Pure Mathematics P3

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.

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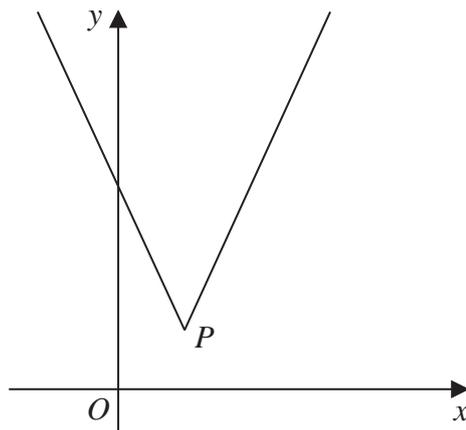


Figure 1

Figure 1 shows a sketch of part of the graph with equation $y = f(x)$, where

$$f(x) = |3x - 13| + 5 \quad x \in \mathbb{R}$$

The vertex of the graph is at point P , as shown in Figure 1.

(a) State the coordinates of P . (2)

(b) (i) State the range of f .
 (ii) Find the value of $ff(4)$ (2)

(c) Solve, using algebra and showing your working,
 $16 - 2x > |3x - 13| + 5$ (4)

The graph with equation $y = f(x)$ is transformed onto the graph with equation $y = af(x + b)$

The vertex of the graph with equation $y = af(x + b)$ is $(4, 20)$

Given that a and b are constants,

(d) find the value of a and the value of b . (2)

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8. A curve C has equation $y = f(x)$, where

$$f(x) = \arcsin\left(\frac{1}{2}x\right) \quad -2 \leq x \leq 2 \quad -\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$$

(a) Sketch C .

(1)

(b) Given $x = 2 \sin y$, show that

$$\frac{dy}{dx} = \frac{1}{\sqrt{A - x^2}}$$

where A is a constant to be found.

(3)

The point P lies on C and has y coordinate $\frac{\pi}{4}$

(c) Find the equation of the tangent to C at P . Write your answer in the form $y = mx + c$, where m and c are constants to be found.

(3)

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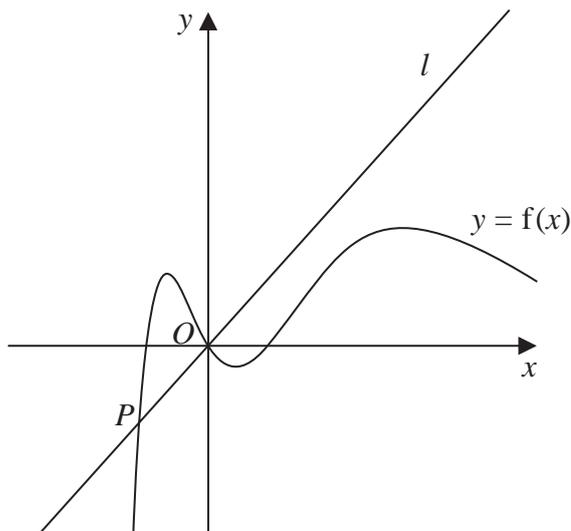


Figure 3

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

$$f(x) = x(x^2 - 4)e^{-\frac{1}{2}x}$$

- (a) Find $f'(x)$. (2)

The line l is the normal to the curve at O and meets the curve again at the point P .

The point P lies in the 3rd quadrant, as shown in Figure 3.

- (b) Show that the x coordinate of P is a solution of the equation

$$x = -\frac{1}{2}\sqrt{16 + e^{\frac{1}{2}x}} \tag{4}$$

- (c) Using the iterative formula

$$x_{n+1} = -\frac{1}{2}\sqrt{16 + e^{\frac{1}{2}x_n}} \quad \text{with } x_1 = -2$$

find, to 4 decimal places,

- (i) the value of x_2
 (ii) the x coordinate of P . (3)

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