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Surname

Other names

Pearson Edexcel
Level 3 GCE

Centre Number

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Candidate Number

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Mathematics

Advanced Subsidiary
Paper 1: Pure Mathematics

Specimen Paper

Time: 2 hours

Paper Reference

8MA0/01**You must have:**

Mathematical Formulae and Statistical Tables, calculator

Total Marks

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. 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.
- Answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 14 questions in this question paper. The total mark for this paper is 100.
- 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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4.

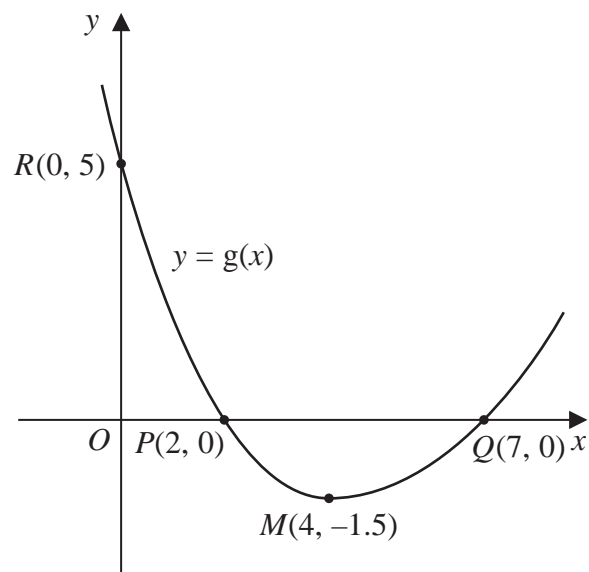


Figure 1

Figure 1 shows a sketch of the curve with equation $y = g(x)$.

The curve has a single turning point, a minimum, at the point $M(4, -1.5)$.

The curve crosses the x -axis at two points, $P(2, 0)$ and $Q(7, 0)$.

The curve crosses the y -axis at a single point $R(0, 5)$.

(a) State the coordinates of the turning point on the curve with equation $y = 2g(x)$. (1)

(b) State the largest root of the equation

$$g(x + 1) = 0 \tag{1}$$

(c) State the range of values of x for which $g'(x) \leq 0$ (1)

Given that the equation $g(x) + k = 0$, where k is a constant, has no real roots,

(d) state the range of possible values for k . (1)



5.

$$f(x) = x^3 + 3x^2 - 4x - 12$$

(a) Using the factor theorem, explain why $f(x)$ is divisible by $(x + 3)$. (2)

(b) Hence fully factorise $f(x)$. (3)

(c) Show that $\frac{x^3 + 3x^2 - 4x - 12}{x^3 + 5x^2 + 6x}$ can be written in the form $A + \frac{B}{x}$ where A and B are integers to be found. (3)

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9. Find any real values of x such that

$$2\log_4(2-x) - \log_4(x+5) = 1 \quad (6)$$

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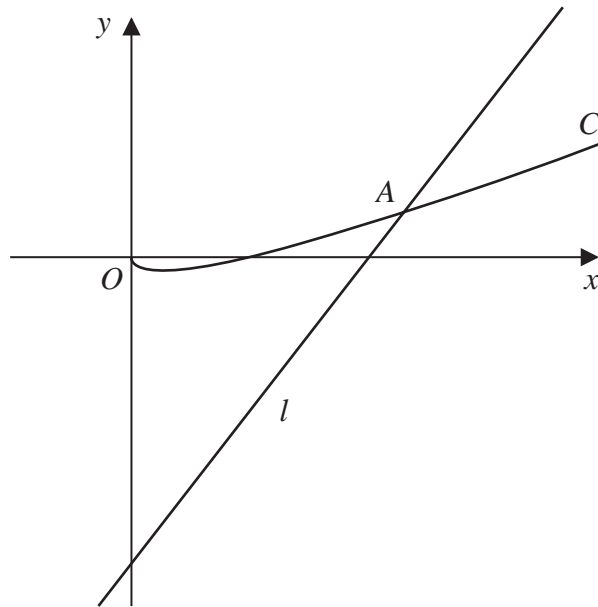


Figure 3

Figure 3 shows a sketch of the curve C with equation $y = 3x - 2\sqrt{x}$, $x \geq 0$ and the line l with equation $y = 8x - 16$

The line cuts the curve at point A as shown in Figure 3.

(a) Using algebra, find the x coordinate of point A . (5)

(b)

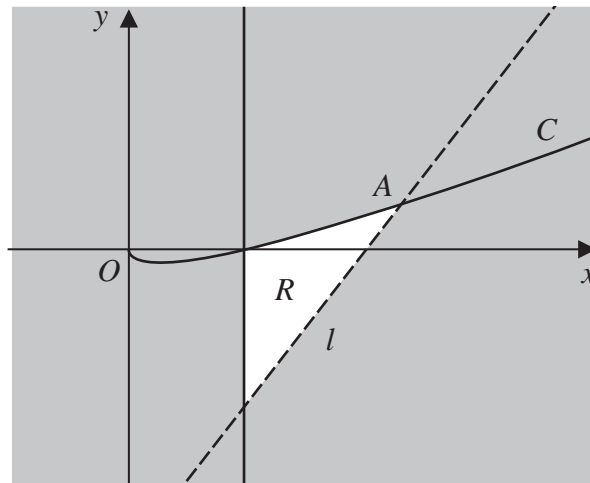


Figure 4

The region R is shown unshaded in Figure 4. Identify the inequalities that define R . (3)



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14.

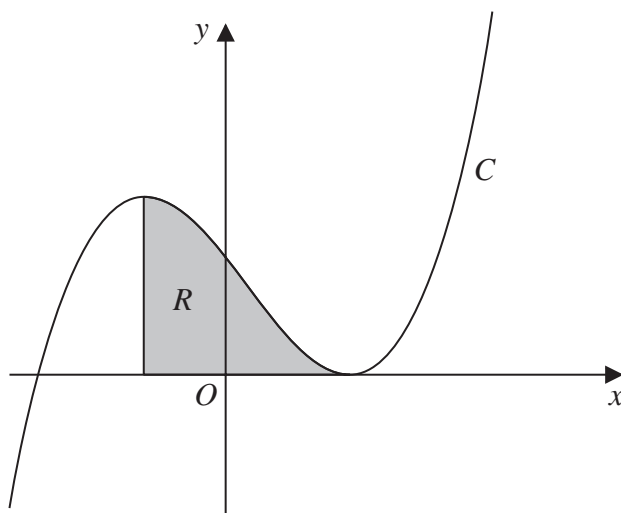


Figure 5

Figure 5 shows a sketch of the curve C with equation $y = (x - 2)^2(x + 3)$

The region R , shown shaded in Figure 5, is bounded by C , the vertical line passing through the maximum turning point of C and the x -axis.

Find the exact area of R .

(Solutions based entirely on graphical or numerical methods are not acceptable.)

(9)

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