

Paper Reference (complete below)		Centre No.				
		Candidate No.				

Surname	Initial(s)
Signature	

Paper Reference(s)

6664

Edexcel GCE

Pure Mathematics C2

Advanced Subsidiary

Specimen Paper

Time: 1 hour 30 minutes

Examiner's use only

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Team Leader's use only

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Materials required for examination

Items included with question papers

Nil

Candidates may use any calculator EXCEPT those with the facility for symbolic algebra, differentiation and/or integration. Thus candidates may NOT use calculators such as the Texas Instruments TI 89, TI 92, Casio CFX 9970G, Hewlett Packard HP 48G..

Question Number	Leave Blank
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Total	

Instructions to Candidates

Tour candidate details are printed next to the bar code above. Check that these are correct and sign your name in the signature box above.
 If your candidate details are incorrect, or missing, then complete ALL the boxes above.
 When a calculator is used, the answer should be given to an appropriate degree of accuracy.
 You must write your answer for each question in the space following the question.
 If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

A booklet 'mathematical Formulae and Statistical Tables' is provided.
 Full marks may be obtained for answers to ALL questions.
 This paper has 9 questions.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly labelled.
 You must show sufficient working to make your methods clear to the examiner. Answers without working may gain no credit

Turn over

 Success through qualifications

2. The circle C has centre $(3, 4)$ and passes through the point $(8, -8)$.

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Find an equation for C .

(4)

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3. The trapezium rule, with the table below, was used to estimate the area between the curve $y = \sqrt{x^3 + 1}$, the lines $x = 1$, $x = 3$ and the x -axis.

x	1	1.5	2	2.5	3
y	1.414	2.092	3.000		

- (a) Calculate, to 3 decimal places, the values of y for $x = 2.5$ and $x = 3$. (2)

- (b) Use the values from the table and your answers to part (a) to find an estimate, to 2 decimal places, for this area. (4)

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4. Solve, for $0 \leq x < 360^\circ$, the equation

$$3 \sin^2 x = 1 + \cos x,$$

giving your answers to the nearest degree.

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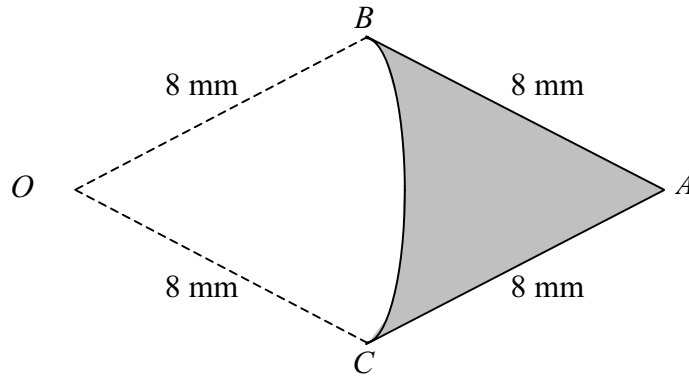
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5.

Figure 1



The shaded area in Fig. 1 shows a badge ABC , where AB and AC are straight lines, with $AB = AC = 8$ mm. The curve BC is an arc of a circle, centre O , where $OB = OC = 8$ mm and O is in the same plane as ABC . The angle BAC is 0.9 radians.

- (a) Find the perimeter of the badge. (2)

- (b) Find the area of the badge. (5)

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6. At the beginning of the year 2000 a company bought a new machine for £15 000. Each year the value of the machine decreases by 20% of its value at the start of the year.

(a) Show that at the start of the year 2002, the value of the machine was £9600. (2)

When the value of the machine falls below £500, the company will replace it.

(b) Find the year in which the machine will be replaced. (4)

To plan for a replacement machine, the company pays £1000 at the start of each year into a savings account. The account pays interest at a fixed rate of 5% per annum. The first payment was made when the machine was first bought and the last payment will be made at the start of the year in which the machine is replaced.

(c) Using your answer to part (b), find how much the savings account will be worth immediately after the payment at the start of the year in which the machine is replaced. (4)

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7. (a) Use the factor theorem to show that $(x + 1)$ is a factor of

$$x^3 - x^2 - 10x - 8.$$

(2)

(b) Find all the solutions of the equation $x^3 - x^2 - 10x - 8 = 0$.

(4)

(c) Prove that the value of x that satisfies

$$2 \log_2 x + \log_2 (x - 1) = 1 + \log_2 (5x + 4) \quad \text{(I)}$$

is a solution of the equation

$$x^3 - x^2 - 10x - 8 = 0.$$

(4)

(d) State, with a reason, the value of x that satisfies equation (I).

(2)

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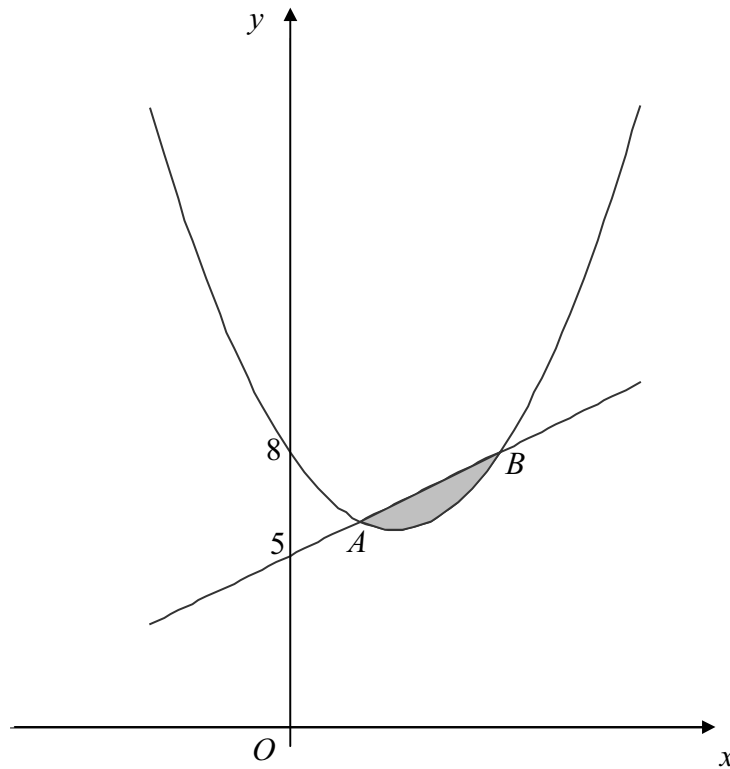
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Figure 2

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The line with equation $y = x + 5$ cuts the curve with equation $y = x^2 - 3x + 8$ at the points A and B , as shown in Fig. 2.

(a) Find the coordinates of the points A and B . (5)

(b) Find the area of the shaded region between the curve and the line, as shown in Fig. 2. (7)

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Figure 3

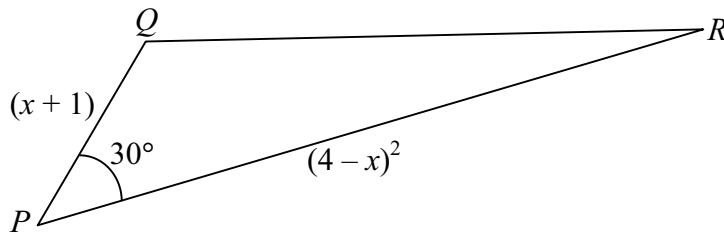


Figure 3 shows a triangle PQR . The size of angle QPR is 30° , the length of PQ is $(x + 1)$ and the length of PR is $(4 - x)^2$, where $x \in \mathbb{R}$.

- (a) Show that the area A of the triangle is given by

$$A = \frac{1}{4}(x^3 - 7x^2 + 8x + 16). \quad (3)$$

- (b) Use calculus to prove that the area of ΔPQR is a maximum when $x = \frac{2}{3}$. Explain clearly how you know that this value of x gives the maximum area.

(6)

- (c) Find the maximum area of ΔPQR .

(1)

- (d) Find the length of QR when the area of ΔPQR is a maximum.

(3)

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