Paper Reference (complete below)	Centre No.					
6663/01	Candidate No.					

Surname	Initial(s)
Signature	

Paper Reference(s)

6663

Edexcel GCE

Core Mathematics C2

Advanced Subsidiary

Set A: Practice Paper 2

Time: 1 hour 30 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
Total	

Materials required for examination
Mathematical Formulae

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.

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature. 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 nine 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

Edexcel
Success through qualifications

1. $f(x) = px^3 + 6x^2 + 12x + q$.

Given that the remainder when $f(x)$ is divided by $(x - 1)$ is equal to the remainder when $f(x)$ is divided by $(2x + 1)$,

(*a*) find the value of *p*. **(4 marks)**

Given also that $q = 3$, and *p* has the value found in part (*a*),

(*b*) find the value of the remainder. **(1 marks)**

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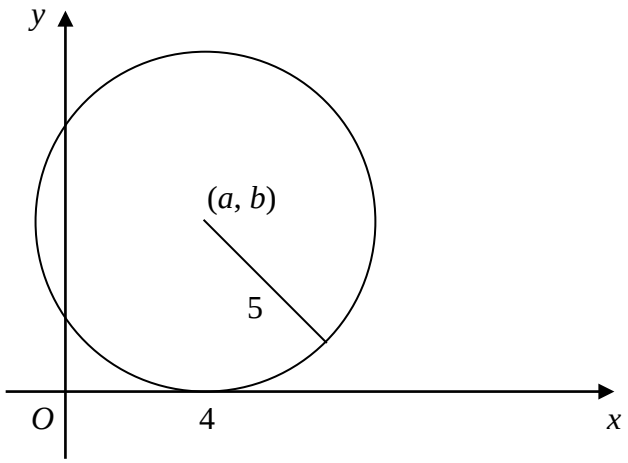
2. **Figure 1**



The circle *C*, with centre (a, b) and radius 5, touches the *x*-axis at (4, 0), as shown in Fig. 1.

(*a*) Write down the value of *a* and the value of *b*. **(1 marks)**

(*b*) Find a cartesian equation of *C*. **(2 marks)**

A tangent to the circle, drawn from the point *P*(8, 17), touches the circle at *T*.

(*c*) Find, to 3 significant figures, the length of *PT*. **(3 marks)**

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3. (*a*) Expand $(2\sqrt{x} + 3)^2$. **(2 marks)**

(*b*) Hence evaluate $\int_1^2 (2\sqrt{x} + 3)^2 \, dx$, giving your answer in the form $a + b\sqrt{2}$, where *a* and *b* are integers. **(5 marks)**

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4. The first three terms in the expansion, in ascending powers of x, of $(1 + px)^n$, are $1 - 18x + 36p^2x^2$. Given that n is a positive integer, find the value of n and the value of p.

(7 marks)

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5. Find all values of θ in the interval $0 \leq \theta < 360$ for which

(*a*) $\cos(\theta + 75)° = 0$. **(3 marks)**

(*b*) $\sin 2\theta° = 0.7$, giving your answers to one decima1 place. **(5 marks)**

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6. Given that $\log_2 x = a$, find, in terms of a, the simplest form of

(*a*) $\log_2(16x)$, **(2 marks)**

(*b*) $\log_2\left(\frac{x^4}{2}\right)$. **(3 marks)**

(*c*) Hence, or otherwise, solve

$$\log_2(16x) - \log_2\left(\frac{x^4}{2}\right) = \frac{1}{2},$$

giving your answer in its simplest surd form. **(4 marks)**

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7. The curve C has equation $y = \cos\left(x + \frac{\pi}{4}\right)$, $0 \leq x \leq 2\pi$.

(*a*) Sketch C. **(2 marks)**

(*b*) Write down the exact coordinates of the points at which C meets the coordinate axes. **(3 marks)**

(*c*) Solve, for x in the interval $0 \leq x \leq 2\pi$,

$$\cos\left(x + \frac{\pi}{4}\right) = 0.5,$$

giving your answers in terms of π. **(4 marks)**

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8. **Figure 2**

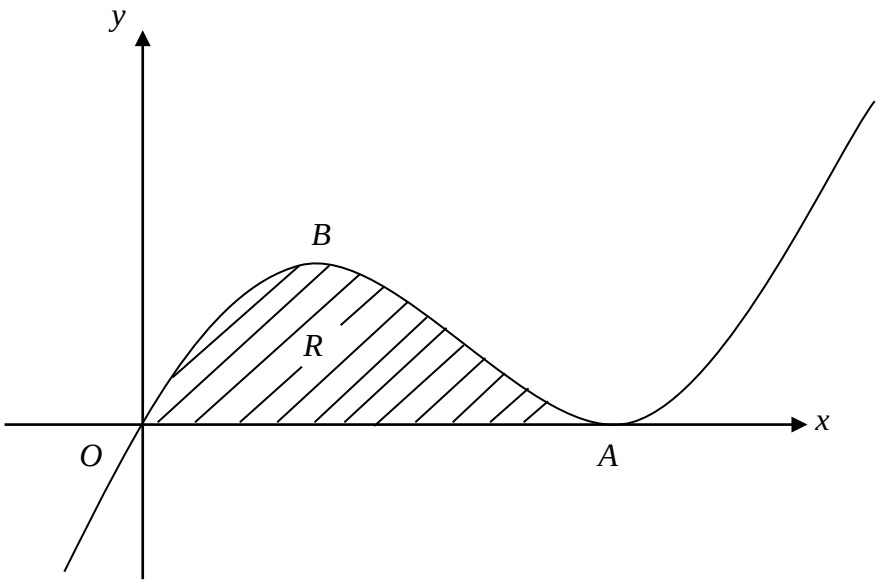

Figure 2 shows part of the curve with equation

$$y = x^3 - 6x^2 + 9x.$$

The curve touches the x-axis at A and has a maximum turning point at B.

(a) Show that the equation of the curve may be written as

$$y = x(x - 3)^2,$$

and hence write down the coordinates of A. **(2 marks)**

(b) Find the coordinates of B. **(5 marks)**

The shaded region R is bounded by the curve and the x-axis.

(c) Find the area of R. **(5 marks)**

9

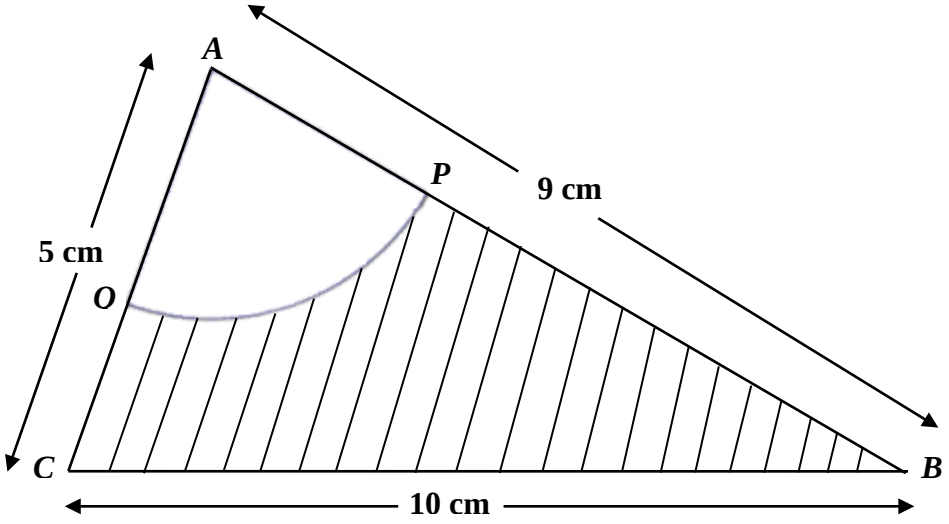

Fig. 3

Triangle ABC has AB = 9 cm, BC 10 cm and CA = 5 cm.

A circle, centre A and radius 3 cm, intersects AB and AC at P and Q respectively, as shown in Fig. 3.

(*a*) Show that, to 3 decimal places, $\angle BAC = 1.504$ radians. **(3 marks)**

Calculate,

(*b*) the area, in cm^2, of the sector APQ, **(2 marks)**

(*c*) the area, in cm^2, of the shaded region $BPQC$, **(3 marks)**

(*d*) the perimeter, in cm, of the shaded region $BPQC$. **(4 marks)**

END