Paper Reference (complete below)	Centre No.	Surname	Initial(s)
6663 / 01	Candidate No.	Signature	

Paper Reference(s)

6663

Edexcel GCE

Core Mathematics C2

Advanced Subsidiary

Set A: Practice Paper 1

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

1. Given that $p = \log_q 16$, express in terms of p,

(a) $\log_q 2$,

(2)

(b) $\log_q (8q)$.

(4)

---

2. The expansion of $(2 - px)^6$ in ascending powers of x, as far as the term in x^2, is

$$64 + Ax + 135x^2.$$

Given that $p > 0$, find the value of p and the value of A.

(7)

---

3. A circle C has equation

$$x^2 + y^2 - 6x + 8y - 75 = 0.$$

(a) Write down the coordinates of the centre of C, and calculate the radius of C.

(3)

A second circle has centre at the point (15, 12) and radius 10.

(b) Sketch both circles on a single diagram and find the coordinates of the point where they touch.

(4)

---

4. (a) Sketch, for $0 \leq x \leq 360°$, the graph of $y = \sin (x + 30°)$.

(2)

(b) Write down the coordinates of the points at which the graph meets the axes.

(3)

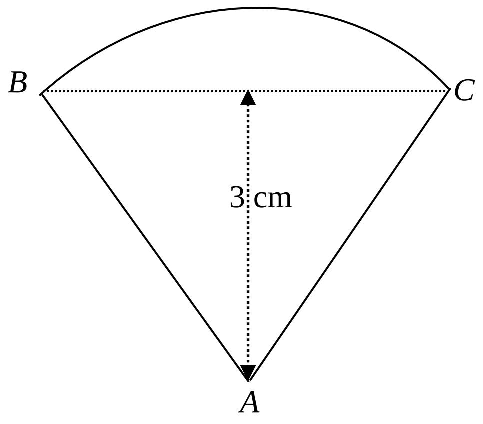
(c) Solve, for $0 \leq x < 360°$, the equation

$$\sin (x + 30°) = -\tfrac{1}{2}.$$

(3)

---

5. **Figure 1**



The shape of a badge is a sector ABC of a circle with centre A and radius AB, as shown in Fig 1. The triangle ABC is equilateral and has a perpendicular height 3 cm.

(a) Find, in surd form, the length AB.

(2)

(b) Find, in terms of π, the area of the badge.

(2)

(c) Prove that the perimeter of the badge is $\frac{2\sqrt{3}}{3}(\pi + 6)$ cm.

(2)

---

6. $$f(x) = 6x^3 + px^2 + qx + 8, \text{ where } p \text{ and } q \text{ are constants.}$$

Given that $f(x)$ is exactly divisible by $(2x - 1)$, and also that when $f(x)$ is divided by $(x - 1)$ the remainder is -7,

(*a*) find the value of p and the value of q.

(6)

(*b*) Hence factorise $f(x)$ completely.

(3)

---

7. A geometric series has first term 1200. Its sum to infinity is 960.

(*a*) Show that the common ratio of the series is $-\frac{1}{4}$.

(3)

(a) Find, to 3 decimal places, the difference between the ninth and tenth terms of the series.

(3)

(*c*) Write down an expression for the sum of the first n terms of the series.

(2)

Given that n is odd,

(*d*) prove that the sum of the first n terms of the series is

$$960(1 + 0.25^n).$$

(2)

---

8. A circle C has centre (3, 4) and radius $3\sqrt{2}$. A straight line l has equation $y = x + 3$.

(*a*) Write down an equation of the circle C.

(2)

(*b*) Calculate the exact coordinates of the two points where the line l intersects C, giving your answers in surds.

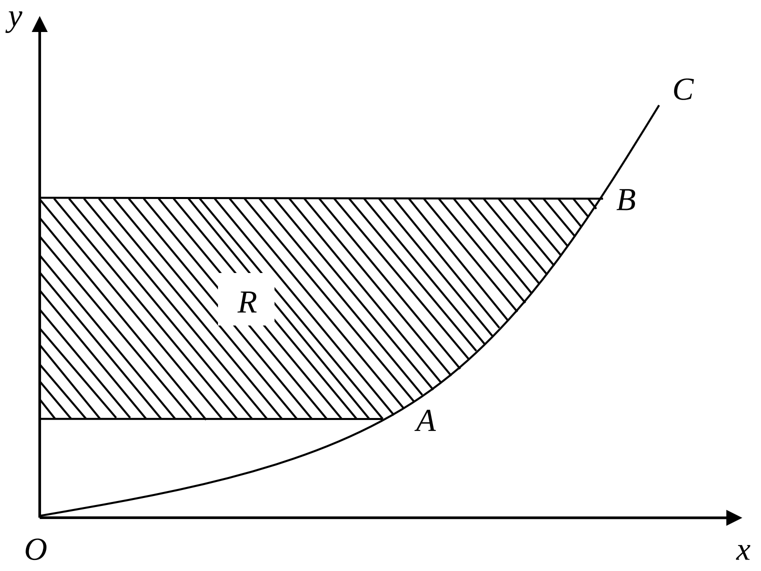
(5)

(*c*) Find the distance between these two points.

(2)

---

9. **Figure 2**



The curve C, shown in Fig. 2, represents the graph of

$$y = \frac{x^2}{25}, \quad x \geq 0.$$

The points A and B on the curve C have x-coordinates 5 and 10 respectively.

(*a*) Write down the y-coordinates of A and B.

(1)

(*b*) Find an equation of the tangent to C at A.

(4)

The finite region R is enclosed by C, the y-axis and the lines through A and B parallel to the x-axis.

(*c*) For points (x, y) on C, express x in terms of y.

(2)

(*d*) Use integration to find the area of R.

(5)

END