

Core Mathematics C2 Advanced Subsidiary

For Edexcel

Paper H

Time: 1 hour 30 minutes

Instructions and Information

Candidates may use any calculator EXCEPT those with the facility for symbolic algebra, differentiation and/or integration.

Full marks may be obtained for answers to ALL questions.

The booklet 'Mathematical Formulae and Statistical Tables', available from Edexcel, may be used.

Advice to Candidates

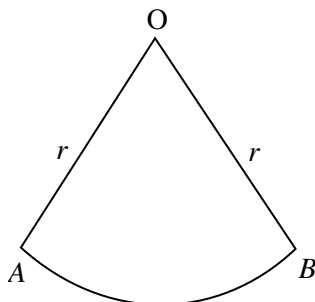
You must show sufficient working to make your methods clear to an examiner.
Answers without working may gain no credit.

Published by Elmwood Press
80 Attimore Road
Welwyn Garden City
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1.



The diagram shows a sector of a circle with centre O and radius r . The length of the arc is equal to one fifth of the perimeter of the sector.

(a) Find the angle AOB in radians (3)

(b) Given that $r = 5$ cm, find the length of the chord AB , in cm to one decimal place (2)

2. The second and fifth terms of a geometric series are 3 and 5.184 respectively.

For this series, find

(a) the common ratio, (2)

(b) the first term, (2)

(c) the sum of the first 10 terms, giving your answer to 3 decimal places, (2)

3. (a) Given that

$$\log_a x = \log_a 3 + 2 \log_a 4$$

where a is a positive constant, show that $x = 48$. (3)

(b) Write down the value of $\log_3 3$. (1)

(c) Given that

$$\log_4 y = \log_3 9,$$

find the value of y . (2)

4. (a) (i) Sketch the curve $y = \sin(x - 10)^\circ$ for $0 \leq x \leq 360^\circ$. (3)
- (ii) Write down the coordinates of the maximum turning point of the curve. (1)

(b) Solve the equation

$$2 \sin(x - 10)^\circ = 1$$

for $0 \leq x \leq 360^\circ$. (4)

5. For the binomial expansion, in descending powers of x , of

$$\left(x^2 + \frac{1}{2x}\right)^9$$

(a) find the first 4 terms, simplifying each term. (5)

(b) Find, in its simplest form, the term independent of x in the expansion. (3)

6. $f(x) = 6x^3 + x^2 + ax + b$, where a and b are constants.

Given that $f(x)$ is exactly divisible by $(3x - 1)$, and also that when $f(x)$ is divided by $(x - 2)$ the remainder is 35,

(a) find the value of a and the value of b . (6)

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

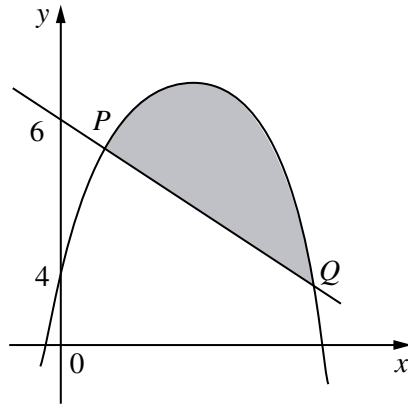
7. A circle C has centre $(2, 5)$ and radius $\sqrt{10}$. A straight line l has equation $y = x + 5$.

(a) Write down an equation of the circle C . (2)

(b) Calculate the coordinates of the two points where the line l intersects C . (5)

(c) Find the distance between these two points. (2)

8.



The line with equation $y = 6 - x$ cuts the curve $y = 4 + 2x - x^2$ at the points P and Q , as shown.

- (a) Find the coordinates of the points P and Q . (5)
- (b) Find the area of the shaded region between the line and the curve as shown in the diagram. (7)
-

9.

$$f(x) = 1 + x + x^2 - x^3.$$

- (a) Find the coordinates of the turning points of the curve $y = f(x)$. (5)
- (b) Determine the nature of the turning points (2)
- (c) Sketch curve $y = f(x)$ (3)
- (d) State the number of real solutions to the equation
- (i) $f(x) = 0$, (1)
- (ii) $f(x) = 1$. (1)
-

END

TOTAL 75 MARKS