

Core Mathematics C1 Advanced Subsidiary

For Edexcel

Paper K

Time: 1 hour 30 minutes

Instructions and Information

Candidates may NOT use a calculator in this paper.

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.

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1. Find the integer n such that

$$2\sqrt{20} - \sqrt{45} = \sqrt{n}. \quad (4)$$

2. The points A and B have coordinates $(3, -1)$ and $(5, 3)$ respectively.

The straight line which passes through A and B meets the x -axis at P and the y -axis at Q . Find the area of the triangle OPQ , where O is the origin. (6)

3. Given that $2^x = \frac{4}{\sqrt{2}}$ and $2^y = 8\sqrt{2}$

(a) find the exact value of x and the exact value of y , (3)

(b) calculate the exact value of 2^{y-x} . (2)

4. (a) Find the sum of all the integers between 1 and 1000 which are divisible by 9. (3)

(b) Hence, or otherwise, evaluate $\sum_{r=1}^{111} (9r + 1)$. (3)

5.
$$y = 2x + \sqrt{x} - 5$$

(a) Find $\frac{dy}{dx}$. (2)

(b) Find $\int y \, dx$. (3)

6. Given that

$$f'(x) = 2 - \frac{8}{x^2}, \quad x \neq 0,$$

(a) find an expression for $f(x)$. (3)

Given also that

$$f(4) = 3f(1),$$

(b) find $f(8)$. (5)

7. (a) Express $2x^2 + 4x - 3$ in the form

$$a[(x + p)^2 + q],$$

stating the values of the constants a , p and q .

(4)

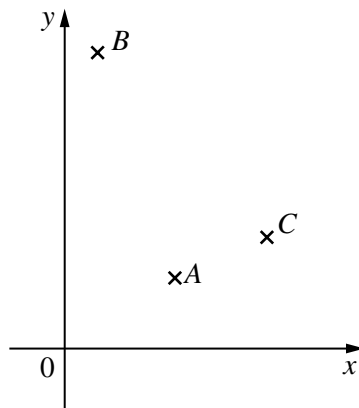
(b) Sketch the graph of $y = 2x^2 + 4x - 3$, stating the coordinates of the vertex.

(3)

(c) Solve the equation $2x^2 + 4x - 3 = 3$.

(3)

8. The points A , B and C have coordinates $(5, 2)$, $(1, 10)$ and $(9, 4)$ respectively.



(a) Find an equation for the straight line BC in the form $ax + by = c$, where a , b and c are integers.

(3)

(b) Prove that the triangle ABC is right-angled and find its area.

(3)

(c) Determine an equation for the straight line which passes through A and which is perpendicular to BC .

(3)

9. The gradient of the curve C is given by

$$\frac{dy}{dx} = 3(x + 2)^2$$

The point $P(0, 4)$ lies on C .

(a) Find an equation of the normal to C at P .

(4)

(b) Find an equation for the curve C in the form $y = f(x)$.

(5)

10.

$$f(x) = 4 - (x - 1)^2$$

- (a) Write down the maximum value of $f(x)$. (1)
- (b) Sketch the graph of $y = f(x)$, showing the coordinates of the points at which the graph meets the coordinate axes. (5)
- The points A and B on the graph of $y = f(x)$ have coordinates $(-2, -5)$ and $(2, k)$ respectively.
- (c) Find the value of k . (1)
- (d) Find, in the form $y = mx + c$, an equation of the straight line through A and B . (4)
- (e) Find the coordinates of the point at which the line AB crosses the x -axis. (2)

END

TOTAL 75 MARKS