Core Mathematics C1 For Edexcel Advanced Subsidiary

Paper F

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.

Published by Elmwood Press
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1. (*a*) Simplify $\dfrac{n^{\frac{1}{3}}n^{\frac{1}{3}}}{n}$.

(1)

(*b*) Simplify $(3\sqrt{2}+1)(\sqrt{2}-1)$

(1)

(*c*) Express $\dfrac{\sqrt{2}}{\sqrt{2}+1}$ in the form $a+b\sqrt{2}$, where a and b are integers to be determined.

(3)

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2. Solve the simultaneous equations

$$y = 7 - 3x$$

$$xy + 12 = 2x$$

(5)

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3. The nth term of a sequence is defined by

$$u_n = n^2 - 5n + 7, \quad n \geq 1.$$

(*a*) Find the first and second terms of the sequence.

(2)

(*b*) For what value of n is the nth term of the sequence equal to 31?

(4)

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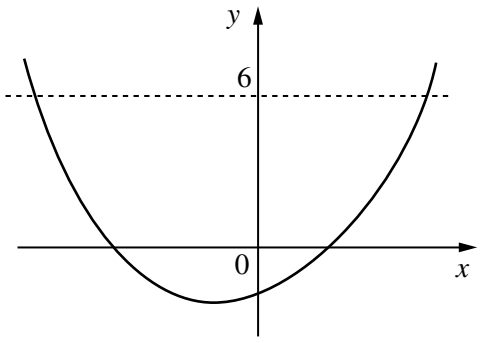
4. The equation of a curve is $y = x^2 + 3x - 4$.

Find the gradient of the curve at the two points where the curve meets the line $y = 6$.



(7)

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5. The equation $x^2 + mx + m = 0$ has no real roots for x.

Find the set of values that m can take.

(5)

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6. Given that

$$\frac{dy}{dx} = 10x^4 + 3$$

and that $y = 2$ when $x = 1$, find the value of y when $x = -1$.

(6)

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7. Given that $f(x) = 12 + 5x - 2x^2$

(*a*) find the coordinates of all points at which the graph of $y = f(x)$ crosses the coordinate axes.

(3)

(*b*) Sketch the graph of $y = f(x)$.

(2)

(*c*) The graph of $y = f(x)$ is obtained from the graph of $y = 5x - 2x^2$ by a single transformation. Describe the transformation fully.

(2)

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8. (*a*) Find $\frac{dy}{dx}$ in each of the following cases:

(i) $y = 6x - 5x^3$

(2)

(ii) $y = x^2(x - 4)$

(3)

(iii) $y = 2\sqrt{x}$

(2)

(*b*) The equation of a curve is $y = 3x + \frac{1}{x^2}$.

Find the coordinates of the point on the curve where the gradient of the curve is equal to 1.

(4)

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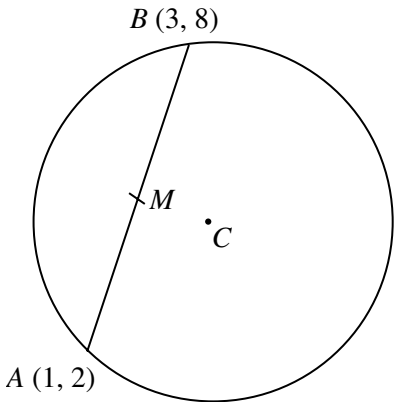
9. **Figure 1**



The points A and B have coordinates (1, 2) and (3, 8) respectively, and AB is a chord of a circle with center C, as shown in Fig. 1.

(a) Find the gradient of AB.

(2)

The point M is the mid-point of AB.

(b) Find an equation for the line through C and M.

(5)

Given that the y-coordinate of C is 4,

(c) find the x-coordinate of C,

(2)

(d) show that the radius of the circle is $2\sqrt{5}$.

(4)

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10. A curve has the equation $y = x^2 - x$.

The point P on the curve has x-coordinate 1.

(a) Find an equation for the normal to the curve at P, giving your answer in the form $y = mx + c$.

(6)

(b) Find the coordinates of the point where the normal to the curve at P intersects the curve again.

(4)

END **TOTAL 75 MARKS**