

Edexcel GCE
Core Mathematics C1
Practice Paper B1
(Mark scheme)

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Question number	Scheme	Marks
1. (a) (b)	$k = 3$ $(2^2)^x = (2^3)^{2-x}$ $2x = 3(2 - x)$ $5x = 6$ $x = 1.2$ A1 for $2x$ and $3(2 - x)$	B1 (1) M1 A1 M1 A1 (4) (5 marks)
2. (a) (b)	$8 + 4\sqrt{7} - 2\sqrt{7} - 7$ $\frac{2 + \sqrt{7}}{4 + \sqrt{7}} \times \frac{4 - \sqrt{7}}{4 - \sqrt{7}} = \frac{1 + 2\sqrt{7}}{16 - 7}$ $c = \frac{1}{9}$ $d = \frac{2}{9}$ $1 + 2\sqrt{7}$	M1 A1 (2) M1 A1 ft A1 (3) (5 marks)
3. (a) (b)	$3x - x > 13 + 8$ $x^2 - 5x - 14 > 0$ $x < -2$ or $x > 7$ $x > \frac{21}{2}$ $(x - 7)(x + 2) > 0$ $x = 7, -2$	M1, A1 (2) B1 M1, A1 ft (3) (5 marks)
4. (a) (b)	$(x + k)^2 = k^2 + c (= 0)$ $(x + k)^2 = k^2 - c$ (Discriminant = 0, $k^2 = 81$) $x = -k \pm \sqrt{k^2 - c}$ $k = 9$, or -9	M1, A1 M1 A1 (4) B1, B1 (2) (6 marks)
5.	$x = 3y - 1$ $(3y - 1)^2 - 3y(3y - 1) + y^2 = 11$ $(y - 5)(y + 2) = 0$ $y = 5$ $y = -2$ $x = 14$ $x = -7$ $y^2 - 3y - 10 = 0$	M1 M1 A1 M1 A1 M1 A1 ft (7 marks)

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<p>6. (a)</p> <p>(b)</p>	$y = 5x - x^{-1} + C$ $7 = 5 - 1 + C, \quad C = 3$ $x = 2: \quad y = 10 - \frac{1}{2} + 3 = 12\frac{1}{2}$	<p>M1 A2 (1,0)</p> <p>M1 A1 ft</p> <p>M1 A1</p> <p>(7 marks)</p>
<p>7. (a)</p> <p>(b)</p> <p>(c)</p>	$A + (n - 1)d = 500 + 39 \times 50 = \text{£}2450$ $\frac{1}{2}n(a + 1) = 20(500 + 2450) = \text{£}59000$ <p>Brian: $20(1780 + 39d) = (b)$</p> <p>Solve: $d = 30$</p>	<p>M1 A1 (2)</p> <p>M1 A1 ft (2)</p> <p>M1 A1 ft</p> <p>M1 A1 (4)</p> <p>(8 marks)</p>
<p>8. (a)</p> <p>(b)</p> <p>(c)</p>	$m = \frac{2 - 6}{12 - 4} \left(= -\frac{1}{2} \right)$ $y - 6 = (\text{their } m)(x - 4) \quad x + 2y = 16$ $y = -4x$ $x + 2(-4x) = 16 \quad -7x = 16 \quad x = -\frac{16}{7}$ $y = \frac{64}{7}$ $A(4, 6), C\left(-\frac{16}{7}, \frac{64}{7}\right): \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) \rightarrow \left(\frac{6}{7}, \frac{53}{7}\right)$	<p>M1 A1</p> <p>M1 A1 (4)</p> <p>B1 (1)</p> <p>M1 A1</p> <p>A1 ft</p> <p>M1 A1 ft (5)</p> <p>(10 marks)</p>

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9. (a) (b) (c) (d)	$\frac{dy}{dx} = 3x^2 - 10x + 5$ $3x^2 - 10x + 5 = 2 \qquad 3x^2 - 10x + 3 = 0$ $(3x - 1)(x - 3) = 0 \quad x = \frac{1}{3}$ <p>When $x = 3$, $y = 27 - 45 + 15 + 2 = -1$</p> $y + 1 = 2(x - 3) \quad y = 2x - 7$ <p>$R: x = 0 \quad y = -7 \quad S: y = 0 \quad x = 3.5$ (Both for M1)</p> $RS = \sqrt{(72 + (\frac{7}{2})^2)} = \frac{7}{2}\sqrt{5} \quad (\text{or equivalent})$	M1 A1 (2) M1 A1 (2) B1 M1 A1 (3) M1 A1 ft M1 A1 (4) (11 marks)
10. (a) (b) (c) (d)	$AB: M = -\frac{4}{3}, \quad BC: M = \frac{3}{4}$ $BC = \sqrt{(8^2 + (k - 4)^2)} \quad (= \sqrt{(k^2 - 8k + 80)})$ $(k^2 - 8k + 80) = 100 \quad (\text{their } BC^2 = 100)$ $k^2 - 8k - 20 = 0 \quad (k - 10)(k + 2) = 0$ $k = 10, k = -2 \text{ (rejected)}$ <p>(11, 6)</p>	B1, M1, A1 ft (3) M1 A1 (2) M1 M1 A1 A1 (4) B1 B1 (2) (11 marks)