

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

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

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