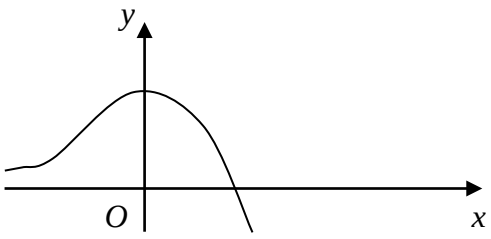
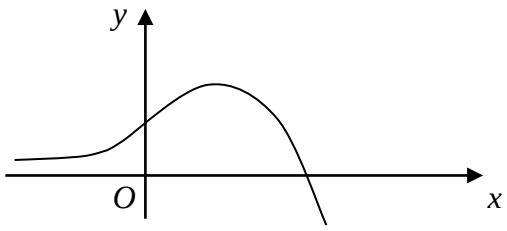
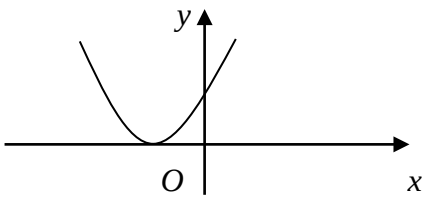
Question number	Scheme	Marks
1.	$a = 7$, $d = 2$ $S_{20} = \frac{1}{2} \times 20 \times (2 \times 7 + 19 \times 2) = 520$	B1 M1 A1 **(3 marks)**
2.	$\int (5x + 3\sqrt{x})\,dx = \frac{5x^2}{2} + 2x^{\frac{3}{2}} + C$	M1 A1 A1 B1 **(4 marks)**
3. (a)	$\sqrt{80} = 4\sqrt{5}$	B1 (1)
(b)	$(4 - \sqrt{5})^2 = 16 - 8\sqrt{5} + 5 = 21 - 8\sqrt{5}$	M1 A1 A1 (3) **(4 marks)**
4.	Gradient of $AB = \frac{4-(-6)}{3-7}$ $\left(= -\frac{5}{2}\right)$ Gradient of $l = \frac{2}{5}$ $y - 4 = \frac{2}{5}(x - 3)$ $\qquad$ $2x - 5y + 14 = 0$	M1 A1 M1 M1 A1 (5) **(5 marks)**
5. (a)	 Position, Shape (0, 2), (2, 0)	B1 B1 B1 (3)
(b)	 Position, Shape (0, 1), $\left(\frac{1}{2}, 2\right)$, $\left(\frac{3}{2}, 0\right)$	B1 B2 (1, 0) (3) **(6 marks)**

Question number		Scheme	Marks
6.	(a)	$5 - 2x = 2x^2 - 3x - 16$ $\quad 2x^2 - x - 21 = 0$	M1 A1
		$(2x - 7)(x + 3) = 0$ $\quad x = -3,\ x = \frac{7}{2}$	M1 A1
		$y = 11,\ y = -2$	M1 A1ft (6)
	(b)	Using critical values $x = -3,$ $\quad x = \frac{7}{2}$	M1
		$x < -3,$ $\quad x > \frac{7}{2}$	M1 A1ft (3)
			(9 marks)
7.	(a)	$a + (n - 1)d = 250 + (10 \times 50) = £750$	M1 A1 (2)
	(b)	$\frac{1}{2}n\left[2a + (n-1)d\right] = \frac{1}{2} \times 20 \times (500 + 19 \times 50),$ $\quad = £14500$	M1 A1, A1 (3)
	(c)	B: $\frac{1}{2} \times 20 \times (2A + 19 \times 60)$ $\quad [= 10(2A + 1140)],$ = "14500"	B1, M1
		Solve for A: $A = 155$	M1 A1 (4)
			(9 marks)
8.	(a)	$a = 5,$ $\quad (x + 5)^2 - 25 + 36$ $\quad b = 11$	B1, M1 A1 (3)
	(b)	$b^2 - 4ac = 100 - 144,$ $\quad < 0,$ therefore no real roots	M1 A1 (2)
	(c)	Equal roots if $b^2 - 4ac = 0$ $\quad 4k = 100$ $\quad k = 25$	M1 A1 (2)
	(d)	 Shape, position	B1 B1
		(–5, 0) (0, 25)	B1 B1ft (4)
			(11 marks)

Question number		Scheme	Marks
9.	(a)	$f(x) = x^3 - 4x^2 + 6x + C$	M1 A1
		$5 = 27 - 36 + 18 + C$ $\quad C = -4$	M1 A1 (4)
	(b)	$x = 2$: $\quad y = 8 - 16 + 12 - 4 = 0$	M1 A1 (2)
	(c)	$f'(3) = 27 - 24 + 6 = 9$, Parallel therefore equal gradient	B1, M1
		$3x^2 - 8x + 6 = 9$ $\quad 3x^2 - 8x - 3 = 0$	M1
		$(3x + 1)(x - 3) = 0$ $\quad Q$: $x = -\frac{1}{3}$	M1 A1 (5)
			(11 marks)
10.	(a)	$\frac{dy}{dx} = 3x^2 - 5 - 2x^{-2}$	M1 A2(1,0)
		At both A and B, $\quad \frac{dy}{dx} = 3 \times 1 - 5 - \frac{2}{1}$ $\quad (= -4)$	M1 A1 (5)
	(b)	Gradient of normal $= \frac{1}{4}$	M1 A1ft
		$y - (-2) = \frac{1}{4}(x - 1)$ $\quad 4y = x - 9$	M1 A1 (4)
	(c)	Normal at A meets y-axis where $x = 0$: $\quad y = -\frac{9}{4}$	B1
		Similarly for normal at B: $\quad 4y = x + 9$ $\quad y = \frac{9}{4}$	M1 A1
		Length of $PQ = \frac{9}{4} + \frac{9}{4} = \frac{9}{2}$	A1 (4)
			(13 marks)