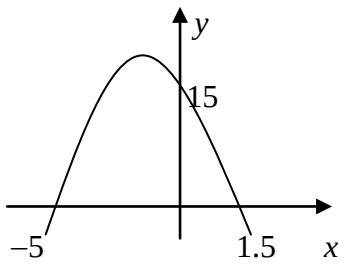
Question number	Scheme	Marks
1. (a)	$y = 5x - x^{-1} + C$	M1 A2 (1,0) (3)
(b)	$7 = 5 - 1 + C$, $C = 3$	M1 A1 ft
	$x = 2$: $y = 10 - \frac{1}{2} + 3 = 12\frac{1}{2}$	M1 A1 (4)
		(7 marks)
2. (a)	77 74	B1 B1 (2)
(b)	$d = 74 - 77 = -3$	B1 ft (1)
(c)	$S_{50} = \frac{1}{2}n\left[2a + (n-1)d\right] = 25\left[(2\times 77) + (49\times -3)\right]$ $= 175$	M1 A1 A1 (3)
		(6 marks)
3 (a)	$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) = \left(\frac{1+5}{2}, \frac{2+8}{2}\right) = (3,5)$	M1 A1 (2)
(b)	Gradient = $\frac{y_2 - y_1}{x_2 - x_1} = \frac{8-2}{5-1}$	M1 A1
	$y - 2 = m(x-1)$ $y = \frac{3}{2}x + \frac{1}{2}$	M1 A1 (4)
	Allow $y = \frac{3x+1}{2}$ or $y = \frac{1}{2}(3x+1)$	**(6 marks)**
4. (a)	$4x(x + 3)$ or $x(4x + 12)$ (or use of quadratic formula)	M1
	$x = 0$ $x = -3$	A1 A1 (3)
(b)	Using $b^2 - 4ac = 0$ $144 - 16c = 0$ $c = 9$	M1 A1
	$(2x + 3)(2x + 3) = 0$ $x = \ldots$ (or quadratic formula)	M1
	$x = -\frac{3}{2}$	A1 (4)
		(7 marks)

Question number	Scheme	Marks
5. (a)	$6x - 2x < 3 + 7$ $\quad x < 2\frac{1}{2}$	M1 A1 (2)
(b)	$(2x - 1)(x - 5)$ $\quad$ Critical values $\frac{1}{2}$ and 5	M1 A1
	$\frac{1}{2} < x < 5$	M1 A1 ft (4)
(c)	$\frac{1}{2} < x < 2\frac{1}{2}$	B1 ft (1)
		(7 marks)
6. (a)	$f(x) = 0 \Rightarrow 2x^2 + 7x - 15 = 0$	
	$(2x - 3)(x + 5) = 0$ attempt to solve $f(x) = 0$	M1
	$\therefore$ points are $(\frac{3}{2}, 0)$, $(-5, 0)$; $(0, 15)$	A1 (both); B1 (3)
	 shape	B1
	vertex in correct quadrant	B1 ft (2)
		(5 marks)

Question number	Scheme	Marks
7. (a)	$u_1 = 1.05 \times 500\,000 - 15\,000 = 510\,000$	M1
	$u_2 =$ $= 520\,000$	
	$u_3 =$ $= 531\,525$	A1 (all 3)
	The population is increasing	B1 (3)
(b)	$u_1 = 425\,000$	
	$u_2 = 346\,250$	
	$u_2 = 263\,562.5$ $u_5 = 85\,577.64\ldots$	M1
	$u_2 = 136\,740.625$ $u_6 = -10\,143.41\ldots 62.5$	A1
	$u_5 > 0$, $u_6 < 0$ so population died out during 6^{th} year	B1 (3)
(c)	Require $u_1 = u_0$ i.e. $1.05 \times 500\,000 - d = 500\,000$	M1
	i.e. $d = 0.05 \times 500\,000$	
	i.e. $d = 25\,000$	A1 (2)
		(8 marks)

Question number	Scheme	Marks
8. (a)	$\frac{dy}{dx} = 3x^2 - 10x + 5$	M1 A1 (2)
(b)	$3x^2 - 10x + 5 = 2$ $\quad 3x^2 - 10x + 3 = 0$ $(3x - 1)(x - 3) = 0$ $\quad x = \frac{1}{3}$	M1 A1 (2)
(c)	When $x = 3$, $\quad y = 27 - 45 + 15 + 2 = -1$	B1
	$y + 1 = 2(x - 3)$ $\quad y = 2x - 7$	M1 A1 (3)
(d)	R: $x = 0$ $\quad y = -7$ $\quad S$: $y = 0$ $\quad x = 3.5$ (Both for M1)	M1 A1 ft
	$RS = \sqrt{(7^2 + (\frac{7}{2})^2} = \frac{7}{2}\sqrt{5}$ (or equivalent)	M1 A1 (4)
		(11 marks)
9. (a)	Gradient of $AB = \frac{4}{8} = \frac{1}{2}$	M1 A1 (2)
(b)	Gradient of $BC = -2$, $\frac{4-2}{k-7} = -2$ (or full Pythag. Method)	M1
	$k = 6$	A1 (2)
(c)	$AB = \sqrt{(4^2 + 8^2)}$	M1 A1
	$= \sqrt{80} = \sqrt{16}\sqrt{5} = 4\sqrt{5}$	A1 (3)
(d)	$BC = \sqrt{(1^2 + 2^2)} = \sqrt{5}$ (or AC = $\sqrt{(7^2 + 6^2)} = \sqrt{85}$)	B1ft
	Area of $ABC = \frac{1}{2}(4\sqrt{5} \times \sqrt{5}) = 10$	M1 A1 (3)
	Other exact methods can score M1 A2.	
	Non-exact methods score M1 A0 (but may gain the B1)	
(e)	$y - 2 = -2(x - 7)$	B1
	$2x + y - 16 = 0$	B1 (2)
		(12 marks)