Q	Marking instructions	AO	Marks	Typical solution
8(a)	Differentiates, at least one term correct.	1.1a	M1	$\frac{dy}{dx} = 3x^2 - 6 - \frac{9}{x^2}$ For stationary point $\frac{dy}{dx} = 0$ $3x^2 - 6 - \frac{9}{x^2} = 0$ $3x^4 - 6x^2 - 9 = 0$ $x^4 - 2x^2 - 3 = 0$
	Obtains correct derivative.	1.1b	A1	
	Sets correct derivative = 0 and rearranges to obtain given equation.	2.1	R1	
	Subtotal		**3**	

Q	Marking instructions	AO	Marks	Typical solution
8(b)	Factorises or solves using calculator. PI	1.1a	M1	$(x^2 - 3)(x^2 + 1) = 0$ $(x^2 - 3) = 0$ gives stationary points at $\pm\sqrt{3}$ $(x^2 + 1) = 0$ has no real solutions so there are only two stationary points
	Obtains two correct factors or obtains two correct solutions. ACF	1.1b	A1	
	Concludes that as there are only 2 solutions, there are only 2 stationary points. OE	2.2a	R1	
	Subtotal		**3**	

Q	Marking instructions	AO	Marks	Typical solution
8(c)	Differentiates their $\frac{dy}{dx}$ again, at least one of the two non-zero terms correct, or uses values to test the sign of $\frac{dy}{dx}$ close to their $\pm\sqrt{3}$ OE	1.1a	M1	$\frac{d^2y}{dx^2} = 6x + \frac{18}{x^3}$ At $(\sqrt{3}, 0)$ $\frac{d^2y}{dx^2}$ is positive therefore this is a minimum point At $(-\sqrt{3}, 0)$ $\frac{d^2y}{dx^2}$ is negative therefore this is a maximum point
	Makes consistent deduction about the nature of one of their stationary points from sign of their $\frac{d^2y}{dx^2}$ or the sign of $\frac{dy}{dx}$ close to their $\pm\sqrt{3}$	1.1a	M1	
	States correct coordinates for one stationary point. ACF	1.1b	B1	
	Obtains the correct exact coordinates of both stationary points, along with their correct natures (from correct $\frac{d^2y}{dx^2}$)	1.1b	A1	
	Subtotal		**4**	

Q	Marking instructions	AO	Marks	Typical solution
8(d)	Deduces $y = 0$	2.2a	B1	$y = 0$
	Subtotal		**1**	

	Question 8 Total		**11**	