

Question			Answer	Marks	AO	Guidance
13	(a)		$\frac{dy}{dx} = p - 16x^{-3}$	M1	3.1a	Uses negative powers to attempt to find expression for $\frac{dy}{dx}$ A term in x^{-3} needed for this mark.
			$p - 16x^{-3} = 0$	M1	1.1	Equates their derivative to zero and attempts to solve using $x = 2$
			$p - 16 \times 2^{-3} = 0$	A1	1.1	
			$p = 2$	M1	3.1a	Uses the given coordinates to link p and q , or their p and q in the Cartesian equation
			When $x = 2, y = 7$ so $7 = 2p + \frac{8}{2^2} + q$ So $2p + q = 5$ so $q = 1$	A1 [5]	1.1	FT their p
13	(b)		$\frac{d^2y}{dx^2} = 48x^{-4} = \left[\frac{48}{x^4}\right]$	B1 [1]	1.1	Allow even from wrong values of p and q
13	(c)		At (2, 7) $\frac{d^2y}{dx^2} = 48 \times 2^{-4} = [3] > 0$ So the stationary point is a minimum	M1 A1 [2]	1.1 2.2a	Substitutes $x = 2$ into their (b) Need not be fully evaluated Also allow for arguing the $48x^{-4}$ is always positive. Do not allow for gradient evaluated on either side of (2, 7) Clear statement using the positivity of the second derivative from correct working in (c). FT their second derivative (stating maximum if their value is negative)