Question	Scheme	Marks
7(a)	$\frac{dy}{dx} = 2mx + \frac{1}{2} \times 64x^{-\frac{1}{2}}$	M1A1
	$32x^{-\frac{1}{2}} + 2mx = 0 \Rightarrow 32 \times 4^{-\frac{1}{2}} + 2m \times 4 = 0 \Rightarrow 16 + 8m = 0 \Rightarrow m = -2$	dM1A1
	$n = 39 + 64\sqrt{4} - 2 \times 4^2 = 135$	dM1A1 [6]
(b)	$\frac{d^2y}{dx^2} = -\frac{1}{2} \times 32x^{-\frac{3}{2}} - 4 = -16x^{-\frac{3}{2}} - 4$	M1
	$\frac{d^2y}{dx^2} = -6 < 0 \Rightarrow$ maximum	A1FT [2]
		Total 8 marks

Part	Mark	Notes
(a)	M1	For an attempt to differentiate the given expression. Minimum required is **two** of: • $mx^2 \rightarrow kmx, \quad k \neq 0$ • $64\sqrt{x} \rightarrow nx^{-\frac{1}{2}}, \quad n \neq 0$ • $39 \rightarrow 0$
	A1	For a correct derivative in terms of m
	dM1	For setting their $\frac{dy}{dx} = 0$, substitute $x = 4$ and attempting to solve to find the value of m Dep on 1st M mark.
	A1	For $m = -2$
	dM1	For using their value of m to find a value for n $n = 4^2 \times m + 167$ Dep on 1st M mark.
	A1	For the correct value of n
(b)	M1	For finding the second derivative. Minimum required is $\frac{d^2y}{dx^2} = km + px^{-\frac{3}{2}}$ with k, p not 0. Allow for substituting x values on either side of $x = 4$ into *their* $\frac{dy}{dx}$ provided $\frac{dy}{dx} = kmx + nx^{-\frac{1}{2}}$ with k, n not 0.
	A1FT	For substituting their value of m and forming a correct conclusion. Minimum required is substitution of their value of m together with $x = 4$ into their second derivative, evaluation and correct conclusion. Allow for evaluating of $\frac{dy}{dx}$ on either side of $x = 4$ and forming a correct conclusion. $x = 3.9, \frac{dy}{dx} = 0.6038 \ldots \quad x = 4.1, \frac{dy}{dx} = -0.596 \ldots$