Question Number	Scheme	Notes	Marks
6(a)	$x = 9t^2, y = 18t \Rightarrow \frac{dy}{dx} = \frac{18}{18t}$ or $y^2 = 36x \Rightarrow 2y\frac{dy}{dx} = 36 \Rightarrow \frac{dy}{dx} = \frac{18}{y} = \frac{18}{18t}$ or $y^2 = 36x \Rightarrow y = 6\sqrt{x} \Rightarrow \frac{dy}{dx} = \frac{3}{\sqrt{x}} = \frac{3}{3t}$	Correct $\frac{dy}{dx}$ in terms of t There must be evidence of use of calculus ($\frac{dy}{dx} = \frac{1}{t}$ with no working scores B0)	B1
	$m_T = \frac{1}{t} \Rightarrow m_N = -t$	Correct use of the perpendicular gradient rule.	M1
	$y - 18t = -t\left(x - 9t^2\right)$	Correct straight line method for the normal. Must use their perpendicular gradient – not dy/dx. (Any complete method – use of $y = mx + c$ requires an attempt at "c")	dM1
	$y + tx = 9t^3 + 18t$ *	Cso All previous marks must have been earned	A1*
			(4)
(b)	$x = 54, y = 0 \Rightarrow 54t = 9t^3 + 18t$ $\Rightarrow 9t^3 - 36t = 0$	Substitutes $x = 54$ and $y = 0$ into the equation from part (a) and attempts to collect terms.	M1
	$9t^3 - 36t = 0 \Rightarrow 9t\left(t^2 - 4\right) = 0$ $\Rightarrow t = \pm 2 \Rightarrow y \pm 2x = 9\left(\pm 2\right)^3 + 18\left(\pm 2\right)$	Solves to obtain at least one non zero value for t and attempts at least one normal equation	dM1
	$y = -2x + 108$ **or** $y = 2x - 108$	One correct equation in any equivalent form	A1
	$y = -2x + 108$ **and** $y = 2x - 108$	Both correct and in the required form	A1
			(4)
(c)	$x = -9 \Rightarrow y = 18 + 108$ or $-18 - 108$	Uses $x = -9$ to find the y coordinate of A or B	M1
	Area = $\frac{1}{2} \times 252 \times 18$	Fully correct strategy for the area Award M0 if their x coord of the focus is not doubled	M1
	= 2268	Cao	A1
			(3)
			Total 11
ALT	Last 2 marks by "shoelace" method: eg $\left\| \frac{1}{2} \begin{vmatrix} -9 & 9 & -9 & -9 \\ 126 & 0 & -126 & 126 \end{vmatrix} \right\|$ $= \left\| \frac{1}{2}\left(9 \times -126 - 9 \times 126 - \left(-9 \times -126 + 9 \times 126\right)\right) \right\|$ = 2268	Their coordinates with first and last the same ½ must be included Attempt to expand also needed Must be positive	M1 A1