Question Number	Scheme	Notes	Marks
6(a)	$xy=100 \Rightarrow y=100x^{-1} \Rightarrow \frac{\mathrm{d}y}{\mathrm{d}x}=-100x^{-2}$ or $\Rightarrow x\frac{\mathrm{d}y}{\mathrm{d}x}+y=0 \Rightarrow \frac{\mathrm{d}y}{\mathrm{d}x}=-\frac{y}{x}$ or $x=10t, y=\frac{10}{t} \Rightarrow \frac{\mathrm{d}y}{\mathrm{d}x}=\frac{-10t^{-2}}{10}$ **Any** correct expression for $\frac{\mathrm{d}y}{\mathrm{d}x}$. Does not need to be in terms of t. Allow for a correct $\frac{\mathrm{d}x}{\mathrm{d}y}=-\frac{x^2}{100}$ or $-\frac{x}{y}$ or $-\frac{100}{y^2}$ May use $-\frac{\mathrm{d}x}{\mathrm{d}y}$. Condone just $\frac{\mathrm{d}y}{\mathrm{d}x}$ or $m_{\{T\}}=-\frac{1}{t^2}$.		B1
	$m_T=-\frac{100}{100t^2} \Rightarrow m_N=t^2$ or $m_T=-\frac{\frac{10}{t}}{10t} \Rightarrow m_N=t^2$ or $m_T=-t^{-2} \Rightarrow m_N=t^2$ Correct use of the perpendicular gradient rule to obtain a normal gradient **at** $\left(10t, \frac{10}{t}\right)$ May come directly from $-\frac{\mathrm{d}x}{\mathrm{d}y}$. Starting with just $m_N=t^2$ scores 0110 maximum.		M1
	$y-\frac{10}{t}=t^2\left(x-10t\right)$ or $y=t^2x+c, \frac{10}{t}=t^2\times 10t+c \Rightarrow c=... \left\{\frac{10}{t}-10t^3\right\}$	Correctly forms the normal equation with a changed gradient in terms of t. Condone late substitution of $x=10t$ and/or $y=\frac{10}{t}$ into gradient if initial gradient not in terms of t (the previous mark is then accessible as is the A1*)	M1
	e.g., $ty-10=t^3x-10t^4$ or $ty=t^3x+10-10t^4 \Rightarrow t^3x-ty=10\left(t^4-1\right)$* Obtains the given answer **with intermediate line** and no errors. Final answer could be reversed and terms/products could be in a different order but must have factorised $10t^4-10$. Allow e.g., t^3x-ty written as $t\left(xt^2-y\right)$ All previous marks are required.		A1*
			(4)

Question Number	Scheme	Notes	Marks
6(b)	$x=0 \Rightarrow -ty=10\left(t^4-1\right) \Rightarrow y=...\left\{-\dfrac{10\left(t^4-1\right)}{t}\right\}$	Substitutes $x = 0$ to find y for Q May just restate their c from (a). Apply BOD throughout if the minus sign just disappears	M1
	$\dfrac{1}{2}\left("\dfrac{10\left(t^4-1\right)}{t}"\right)\times 10t=750$ May see x-axis intercept also used e.g., $\dfrac{1}{2}\times"\dfrac{10\left(t^4-1\right)}{t^3}"\times\left(\dfrac{10}{t}+"\dfrac{10\left(t^4-1\right)}{t}"\right)=750$ Allow with modulus signs used	Correct method for the area of the triangle and sets = 750 or equivalent work e.g., $\left("10t^3-\dfrac{10}{t}"\right)\times 10t=1500$ Allow with their y (and possibly their x-axis intercept) and allow for the sign of their y (and/or x) coordinate uncorrected and note that $-10t$ may be used with uncorrected y. There are no marks if they have Q on the x-axis instead of the y-axis	M1
	"Shoelace" methods only get credit when the determinants are processed. Look for expressions as above.		
	We will score the first 2 M marks in this order for this possible variation: $\frac{1}{2}\left\|y_Q\right\|\times 10t=750 \Rightarrow y_Q=-\frac{150}{t}$ 1st M1: Uses a correct triangle method to find y coord. $\left(0, \frac{-150}{t}\right)$ in $t^3x-ty=10\left(t^4-1\right) \Rightarrow 150=10\left(t^4-1\right)$ 2nd M1: Subs. into normal equation		
	$\frac{1}{2}\left(\dfrac{10\left(t^4-1\right)}{t}\right)\times 10t=750$ or $\frac{1}{2}\left(10t^3-\dfrac{10}{t}\right)\times 10t=750$ or $\frac{1}{2}\left(-\dfrac{10\left(t^4-1\right)}{t}\right)\times -10t=750$ or $\frac{1}{2}\left(\dfrac{10}{t}-10t^3\right)\times -10t=750$ $\Rightarrow \left\{50t^4-50=750 \Rightarrow\right\} t^4=...\{16\}$ Reaches $t^4 = ...$ (or $t^2 = ...$ or $t = ...$) from a **correct** equation. Allow if ... is negative. If they additionally work with an incorrect equation then ignore this work. Modulus signs must have been removed although this could happen later in the working, but do be vigilant with attempts where e.g., the "16" has clearly not been obtained appropriately.	M1
	$\left\{\Rightarrow t=\pm 2 \Rightarrow\left(10\times\pm 2,\ \dfrac{10}{\pm 2}\right)\Rightarrow\right\}\ (20,\ 5),\ (-20,\ -5)$ only A1: One correct pair of coordinates A1: Both correct and no others including complex solutions. Allow for $x = ...$, $y = ...$ but must be clearly paired correctly Allow $\pm(20,\ 5)$ or $(\pm 20,\ \pm 5)$ Score A1 A0 for e.g., $(\pm 20,\ \pm\frac{10}{2})$ **Do not accept correct coordinates if they have come from an incorrect equation.** Note that the second pair of coordinates might be deduced.	A1 A1
			(5)
			Total 9