Q	Marking instructions	AO	Mark	Typical solution
8(a)	Eliminates t	1.1a	M1	$\frac{y}{2} = t, \quad x = \frac{y^2}{4}$
	Writes the Cartesian equation in the required form	1.1b	A1	$y^2 = 4x$
	Subtotal		**2**	
8(b)(i)	Differentiates both $\frac{dx}{dt} = 2t$, $\frac{dy}{dt} = 2$ with at least one correct Or Differentiates their $y^2 = 4x$ to obtain $y\frac{dy}{dx} = A$ Or rearranges and differentiates $y = 2\sqrt{x}$ and obtains $\frac{dy}{dx} = Ax^{-\frac{1}{2}}$ OE	3.1a	M1	$\frac{dx}{dt} = 2t, \quad \frac{dy}{dt} = 2$ $\frac{dy}{dx} = \frac{2}{2a} = \frac{1}{a}$ The gradient of a line is equal to the tangent of the angle between the line and the horizontal hence $\tan\theta = \frac{1}{a}$
	Obtains correct $\frac{dy}{dx}$ at $t = a$	1.1b	A1	
	Explains that the gradient of a line is the tangent of the angle between the line and the horizontal or shows on right-angled triangle on diagram and links to $\tan\theta$ **and** concludes $\tan\theta = \frac{1}{a}$	2.4	E1	
	Subtotal		**3**	
8(b)(ii)	Uses formula for gradient of straight line with points A and B Must have $a^2 - 1$ or $1 - a^2$ in denominator	1.1a	M1	$\tan\phi = \frac{2a - 0}{a^2 - 1}$ $= \frac{2a}{a^2 - 1}$
	Obtains correct $\tan\phi$ OE	1.1b	A1	
	Subtotal		**2**	

8(b)(iii)	States double angle formula for $\tan 2\theta$	1.2	B1	$\tan 2\theta = \dfrac{2\tan\theta}{1-\tan^2\theta}$
	Substitutes $\tan\theta = \dfrac{1}{a}$ into their $\tan 2\theta = \dfrac{2\tan\theta}{1\pm\tan^2\theta}$	1.1a	M1	$= \dfrac{2\times\frac{1}{a}}{1-\left(\frac{1}{a}\right)^2}$
	Simplifies and completes argument to show required result	2.1	R1	$= \dfrac{2a}{a^2-1}$ $= \tan\phi$
	Subtotal		**3**	
	Question Total		**10**	