Question			Answer	Marks	AO	Guidance	
6	(a)		$x = 4k + k\sin t, y = 2 + 4\cos t$ $\sin t = \frac{x-4k}{k}, \cos t = \frac{y-2}{4}$ and use of $\sin^2 t + \cos^2 t = 1$	M1	3.1a	Re-arranges to obtain both $\sin t = \frac{x \pm 4k}{k}$ **and** $\cos t = \frac{y \pm 2}{4}$ **and** use $\sin^2 t + \cos^2 t = 1$ to eliminate t	
			$\frac{(x-4k)^2}{k^2} + \frac{(y-2)^2}{16} = 1$	A1 [2]	1.1	Allow any correct un-simplified cartesian form not involving trigonometric terms	ISW once a correct answer seen

SC for part **(a)**: If **M0** awarded then **SC B1** for $y = 2 + 4\cos\left(\arcsin\left(\frac{x-4k}{k}\right)\right)$ **or** $x = 4k + k\sin\left(\arccos\left(\frac{y-2}{4}\right)\right)$ **or** $\arcsin\left(\frac{x-4k}{k}\right) = \arccos\left(\frac{y-2}{4}\right)$ (or any correct form in terms of trig. functions – allow $\cos^{-1}$ for arccos etc.)

If considering one branch only e.g. $y(= 2 + 4\sqrt{1-\sin^2 t}) = 2 + 4\sqrt{1-\left(\frac{x-4k}{k}\right)^2}$ this scores **M1** only (or equivalent expression for x)

If considering both branches e.g. $y(= 2 \pm 4\sqrt{1-\sin^2 t}) = 2 \pm 4\sqrt{1-\left(\frac{x-4k}{k}\right)^2}$ then this scores **M1 A1** (or equivalent expression for x)

Note a (common) correct answer for **M1 A1** is: $x^2 + y^2 = 16k^2 + 8k(x-4k) + (x-4k)^2 + 4 + 4(y-2) + (y-2)^2$

Question			Answer	Marks	AO	Guidance	
6	(b)	(i)	C is a circle $\Rightarrow k^2 = 16$	M1	3.1a	Setting c and d equal in their $\frac{(x \pm a)^2}{c} + \frac{(y \pm b)^2}{d} = 1$ **or** stating that $y_{\min} = -2$ **and** $y_{\max} = 6$	Possibly implied by correct value for r www
			$r = 4$	A1	1.1	$r = \pm 4$ is **A0** unless replaced with positive r only	
				[2]			
6	(b)	(ii)	$(16, 2), (-16, 2)$	B2	2.2a 2.2a	**B1** for either one correct centre **or** both x-coordinates correct	**These marks are dependent on $r = 4$ from correct working or www**
				[2]			