Question			Answer	Marks	AO	Guidance
10	(a)		$(x-2)=5\cos\theta$ and $(y-1)=5\sin\theta$	M1	3.1a	allow sign errors
			$(x-2)^2+(y-1)^2=(5\cos\theta)^2+(5\sin\theta)^2$ **oe**	M1	1.1	**or** $\left(\frac{x-2}{5}\right)^2+\left(\frac{y-1}{5}\right)^2=\cos^2\theta+\sin^2\theta$ **oe**
			$(x-2)^2+(y-1)^2=5^2$ **oe isw**	A1	1.1	may see eg $x^2-4x+y^2-2y=20$
			or $\frac{(x-2)^2}{5^2}+\frac{(y-1)^2}{5^2}=1$ **oe isw**			if **M0M0** allow **SC1** for $y=1+5\sin\left(\cos^{-1}\left(\frac{x-2}{5}\right)\right)$ or $x=2+5\cos\left(\sin^{-1}\left(\frac{y-1}{5}\right)\right)$
				[3]		
			Alternatively $x^2=(2+5\cos\theta)^2$ and $y^2=(1+5\sin\theta)^2$	M1		if only seen in expanded form, allow one coefficient error; allow sign errors
			$x^2+y^2=5+20\cos\theta+10\sin\theta+25\sin^2\theta+25\cos^2\theta$	M1		must have terms in $\cos\theta$ and $\sin\theta$
			$x^2+y^2=20+4x+2y$ **oe isw**	A1		
			Alternatively radius = 5 and centre is (2, 1)	M1		allow sign error in coordinates of centre
			$(x-2)^2+(y-1)^2=5^2$	M1 A1		**FT** their centre all correct

Question			Answer	Marks	AO	Guidance
10	(b)		gradient of radius is $\frac{-4}{3}$	B1	3.1a	
			gradient of tangent is $\frac{3}{4}$	M1	2.1	**FT** $1 \div their -\frac{4}{3}$
			$(y - -3) = \frac{3}{4}(x - 5)$ **oe**	M1	2.4	allow one sign error; **FT** their $\frac{3}{4}$ may see $-3 = \frac{3}{4} \times 5 + c$
			$3x - 4y - 27 = 0$ *or* $-3x + 4y + 27 = 0$	A1	1.1	
				[4]		
			Alternatively $\frac{dy}{dx} = \frac{5\cos\theta}{-5\sin\theta}$ **oe**	B1		**or** $\frac{dy}{dx} = \frac{2-x}{y-1}$ **oe** eg $2(x-2) + 2(y-1)\frac{dy}{dx} = 0$
			substitution of $\cos\theta = \frac{3}{5}$ and $\sin\theta = -\frac{4}{5}$ **oe** **or** (5,–3) in their $\frac{dy}{dx}$	M1		$\frac{dy}{dx} = \frac{3/5}{-(-4/5)}$ **or** $\frac{2-5}{-3-1}$ **oe**; allow one sign error;
			$(y - -3) = \frac{3}{4}(x - 5)$ **oe**	M1		allow one sign error; **FT** their $\frac{3}{4}$ may see $-3 = \frac{3}{4} \times 5 + c$
			$3x - 4y - 27 = 0$ *or* $-3x + 4y + 27 = 0$	A1		
				[4]		