Question	Answer	Marks	AO	Guidance
20	**DR**			
	$[\frac{dx}{dt} =] 4\sin t + 3\cos t$	**M1***	**3.1a**	for differentiation of x with respect to t; allow one sign error; allow slip in notation of $\frac{dx}{dt}$
	$[\frac{dy}{dt} =] -\sin t - 2\cos t$	**M1***	**1.1**	for differentiation of y with respect to t; allow one sign error; allow slip in notation of $\frac{dy}{dt}$
	$[\frac{dy}{dx} =] \frac{-\sin t - 2\cos t}{4\sin t + 3\cos t}$	**M1dep***	**2.1**	**FT** $\frac{their\ \frac{dy}{dt}}{their\ \frac{dx}{dt}}$; dependent on the first two **M** marks
	their $\frac{-\sin t - 2\cos t}{4\sin t + 3\cos t} = 1$	**M1dep***	**3.1a**	dependent on the first three **M** marks
	$\tan t = -1$	**M1dep***	**1.1**	allow **M1** for their $\sin t = -\cos t$ or better; must see correct intermediate step eg $-\sin t - 2\cos t = 4\sin t + 3\cos t$ dependent on the first four **M** marks
	$t = \frac{3\pi}{4}$	**A1**	**2.3**	not from wrong working; do **not** allow if additional answers are given in range; ignore additional values outside the range
	$\left(\frac{7\sqrt{2}}{2}, \frac{-3\sqrt{2}}{2}\right)$	**A1**	**3.2a**	must be exact allow $\left(\frac{7}{\sqrt{2}}, -\frac{3}{\sqrt{2}}\right)$; allow $x = \frac{7\sqrt{2}}{2}$ and $y = \frac{-3\sqrt{2}}{2}$
			[7]	

Question	Answer	Marks	AO	Guidance
	alternative method 1 **after award of the first four M1s**			
	$\sin(t+\frac{\pi}{4})=0$ **or** $\cos(t-\frac{\pi}{4})=0$	**M1dep***	**1.1**	must see correct intermediate step; dependent on award of the first four marks
	$t=\frac{3\pi}{4}$	**A1**	**2.3**	do **not** allow if additional answers are given in range; ignore additional values outside the range; not from wrong working
	$\left(\frac{7\sqrt{2}}{2},\frac{-3\sqrt{2}}{2}\right)$	**A1**	**3.2a**	must be exact; allow $\left(\frac{7}{\sqrt{2}},-\frac{3}{\sqrt{2}}\right)$; allow $x=\frac{7\sqrt{2}}{2}$ and $y=\frac{-3\sqrt{2}}{2}$
	alternative method 2			
	$\left(\frac{2x+3y}{-5}\right)^2+\left(\frac{x+4y}{-5}\right)^2=1$ leads to $x^2+4xy+5y^2=5$	**M1***	**3.1a**	for finding the cartesian equation; allow one sign error
	$2x+4x\frac{dy}{dx}+4y+10y\frac{dy}{dx}=0$	**M1***	**1.1**	for implicit differentiation; allow one sign error
	$\frac{-x-2y}{2x+5y}=1$ **or** setting $\frac{dy}{dx}=1$ **oe**	**M1dep***	**2.1**	dependent on the first two **M** marks; might see eg $6x+14y=0$
	rearranging to get $y=-\frac{3}{7}x$ **or** $x=-\frac{7}{3}y$	**M1dep***	**3.1a**	dependent on the first three **M** marks
	simultaneous equations leading to either $\frac{10}{49}x^2=5$ **or** $\frac{10}{9}y^2=5$	**M1dep***	**1.1**	must see correct intermediate step eg $x^2+4x\left(\frac{-3x}{7}\right)+5(\frac{-3x}{7})^2=5$ dependent on the first four **M** marks
	$x=\frac{7}{\sqrt{2}}$ **or** $y=\frac{-3}{\sqrt{2}}$	**A1**	**2.3**	not from wrong working; allow $x=\frac{\pm 7}{\sqrt{2}}$ **or** $y=\frac{\pm 3}{\sqrt{2}}$; allow exact equivalents
	$\left(\frac{7\sqrt{2}}{2},\frac{-3\sqrt{2}}{2}\right)$	**A1**	**3.2a**	must be exact allow $\left(\frac{7}{\sqrt{2}},-\frac{3}{\sqrt{2}}\right)$; allow $x=\frac{7\sqrt{2}}{2}$ and $y=\frac{-3\sqrt{2}}{2}$
		[7]		