Question	Scheme	Marks	AOs
12	Complete process to find at least one set of coordinates for *P*. The process must include evidence of • differentiating • setting $\frac{dy}{dx}=0$ to find $x=...$ • substituting $x=...$ into $\sin x+\cos y=0.5$ to find $y=...$	M1	3.1a
	$\left\{\frac{dy}{dx}=\right\}\quad \cos x-\sin y\frac{dy}{dx}=0$	B1	1.1b
	Applies $\frac{dy}{dx}=0$ (e.g. $\cos x=0$ or $\frac{\cos x}{\sin y}=0 \Rightarrow \cos x=0) \Rightarrow x=...$	M1	2.2a
	giving at least one of either $x=-\frac{\pi}{2}$ or $x=\frac{\pi}{2}$	A1	1.1b
	$x=\frac{\pi}{2} \Rightarrow \sin\left(\frac{\pi}{2}\right)+\cos y=0.5 \Rightarrow \cos y=-\frac{1}{2} \Rightarrow y=\frac{2\pi}{3}$ or $-\frac{2\pi}{3}$	M1	1.1b
	So in specified range, $(x, y)=\left(\frac{\pi}{2}, \frac{2\pi}{3}\right)$ and $\left(\frac{\pi}{2}, -\frac{2\pi}{3}\right)$, by cso	A1	1.1b
	$x=-\frac{\pi}{2} \Rightarrow \sin\left(-\frac{\pi}{2}\right)+\cos y=0.5 \Rightarrow \cos y=1.5$ has no solutions, and so there are exactly 2 possible points *P*.	B1	2.1
		(7)	
			(7 marks)

Question 12 Notes:

M1:	See scheme
B1:	Correct differentiated equation. E.g. $\cos x-\sin y\frac{dy}{dx}=0$
M1:	Uses the information "the tangent to *C* at the point *P* is parallel to the *x*-axis" to deduce and apply $\frac{dy}{dx}=0$ and finds $x=...$
A1:	See scheme
M1:	For substituting one of their values from $\frac{dy}{dx}=0$ into $\sin x+\cos y=0.5$ and so finds $x=..., y=...$
A1:	Selects coordinates for *P* on *C* satisfying $\frac{dy}{dx}=0$ and $-\frac{\pi}{2} \leqslant x<\frac{3\pi}{2}$, $-\pi<y<\pi$ i.e. finds $\left(\frac{\pi}{2}, \frac{2\pi}{3}\right)$ and $\left(\frac{\pi}{2}, -\frac{2\pi}{3}\right)$ and no other points by correct solution only
B1:	Complete argument to show that there are exactly 2 possible points *P*.