Question Number	Scheme	Marks
9 (i)	States or uses $\tan x = \dfrac{\sin x}{\cos x}$	B1
	$\sin x \tan x = 5 \Rightarrow \sin^2 x = 5\cos x \Rightarrow 1 - \cos^2 x = 5\cos x$	M1A1
	$\cos^2 x + 5\cos x - 1 = 0 \Rightarrow \left(\cos x = \right)\dfrac{-5 \pm \sqrt{29}}{2} \Rightarrow x = \text{awrt } 78.9°, 281.1°$	M1dM1A1
		(6)
(ii)	(a) $A = 5$	B1
		(1)
	(b) $2\theta - \dfrac{3\pi}{8} = \dfrac{3\pi}{2} \Rightarrow \theta = ...$	M1
	$\theta = \dfrac{15\pi}{16}$	A1
	y coordinate $Q = -3$ (or $2 - "A"$)	B1ft
		(3)
	(c) Sets $0 = "5"\sin\left(2\theta - \dfrac{3\pi}{8}\right) + 2 \Rightarrow \sin\left(2\theta - \dfrac{3\pi}{8}\right) = \pm\dfrac{2}{"5"}$	M1
	$\sin\left(2\theta - \dfrac{3\pi}{8}\right) = \pm\dfrac{2}{5} \Rightarrow \left(2\theta - \dfrac{3\pi}{8}\right) = \arcsin\left(\pm\dfrac{2}{5}\right) = ...$	dM1
	One of $\theta = 0.38,\ 2.4,\ 3.5,\ 5.5,\ 6.7,\ 8.6,\ 9.8....$	A1
	$\theta = \text{awrt } 5.51$	A1
		(4)
		Total 14

Question Number	Scheme	Marks
7 (a)	$8\tan\theta = 3\cos\theta$	
	Uses $\tan\theta = \dfrac{\sin\theta}{\cos\theta} \rightarrow$ $\quad 8\dfrac{\sin\theta}{\cos\theta} = 3\cos\theta$	M1
	$8\sin\theta = 3\cos^2\theta$ oe	
	Uses $\cos^2\theta = 1 - \sin^2\theta \rightarrow$ $\quad 8\sin\theta = 3\left(1 - \sin^2\theta\right)$	M1
	$3\sin^2\theta + 8\sin\theta - 3 = 0$ *	A1 *
		(3)
(b)	$(3\sin 2x - 1)(\sin 2x + 3) = 0$	M1
	Critical value(s) of $\dfrac{1}{3}, (-3)$	A1
	Correct method to find x from their $\sin 2x = \dfrac{1}{3}$	dM1
	$x = \text{awrt } 9.74°, 80.26°$	A1
		(4)
		(7 marks)

Question Number	Scheme	Marks
5 (a)	$D = 8 + 5\sin\left(\frac{\pi \times 2}{6} + 3\right) = 4.07$	B1
		(1)
(b)	(b) $6 = 8 + 5\sin\left(\frac{\pi t}{6} + 3\right) \Rightarrow \sin\left(\frac{\pi t}{6} + 3\right) = -\frac{2}{5}$	M1 , A1
	$\Rightarrow \left(\frac{\pi t}{6} + 3\right) = \arcsin\left(-\frac{2}{5}\right) =$ Any of 3.55, 5.87, 9.84, 12.2	dM1
	$\Rightarrow t =$ Any of $\frac{6(3.55-3)}{\pi}, \frac{6(5.87-3)}{\pi}, \frac{6(9.84-3)}{\pi}, \frac{6(12.2-3)}{\pi}$	ddM1
	13:04 or 1:04 pm	A1
		(5)
		Total 6

Question Number	Scheme	Marks
10 (a)	Uses $\tan\theta = \frac{\sin\theta}{\cos\theta}$ o.e. E.g. $\cos\theta\left(3\tan\theta + \frac{2}{\tan\theta}\right) \equiv \cos\theta\left(3\frac{\sin\theta}{\cos\theta} + \frac{2\cos\theta}{\sin\theta}\right)$	M1
	Uses $\sin^2\theta + \cos^2\theta = 1$ E.g. $\equiv 3\sin\theta + \frac{2\cos^2\theta}{\sin\theta} \equiv 3\sin\theta + \frac{2\left(1-\sin^2\theta\right)}{\sin\theta}$	dM1, A1
	$\equiv 3\sin\theta + \frac{2}{\sin\theta} - 2\sin\theta \equiv \sin\theta + \frac{2}{\sin\theta}$	A1*
		(4)
(b)	$\sin x + \frac{2}{\sin x} = 4\sin x - 5 \Rightarrow 3\sin^2 x - 5\sin x - 2 = 0$	M1, A1
	$\Rightarrow \sin x = 2, -\frac{1}{3} \Rightarrow x = 3.5$ for example.	dM1
	$\Rightarrow x = 3.48, 5.94$	A1
		(4)
		(8 marks)