Question	Answer	Marks	Partial Marks
5(a)(iii)	$f'(x) = 6\tan x \sec^2 x$ oe	**M2**	**FT** $2(their 3)\tan x \sec^2 x$ **M1** for $f'(x) = k\tan x \sec^2 x$ where $k \neq 2 their\ 3$
	$\left[f'\left(\frac{\pi}{4}\right)=\right]$ 12; $\left[f'\left(-\frac{\pi}{4}\right)=\right]$ – 12 nfww	**A2**	**A1** for each nfww
5(b)	Correct use of $\sin^2\theta + \cos^2\theta = 1$ to form a 3-term quadratic in $\sin\theta$ in solvable form $50\sin^2\theta + 5\sin\theta - 3\,[=0]$ oe	**M1**	Condone one sign or arithmetic error in rearrangement
	Solves or factorises *their* 3-term quadratic in $\sin\theta$ e.g. $(10\sin\theta + 3)(5\sin\theta - 1)$ [= 0]	**M1**	**FT** *their* 3-term quadratic in $\sin\theta$
	$\sin\theta = -0.3$ $\sin\theta = 0.2$ soi	**A1**	
	11.5 or 11.53[69...] 168.5 or 168.46[30...] 197.5 or 197.45[76...] 342.5 or 342.54[23...]	**A2**	with no extras in range **A1** for any two correct angles, ignoring extras
6(a)	$(2x + 1)(x - 3)(x + 1)$ nfww	**M1**	
	Correct method leading to $x = -\frac{1}{2}$, $x = 3$, $x = -1$	**A1**	
6(b)(i)	$[p'(x) =]\ 3x^2 + 2ax + b\,[=0]$	**B1**	
	$3\left(\frac{4}{3}\right)^2 + 2a\left(\frac{4}{3}\right) + b = 0$	**B1**	OR forms the product $(3x - 4)(x - 2) = 0$
	$3(2)^2 + 2a(2) + b = 0$	**B1**	OR multiplies out to find $3x^2 - 10x + 8 = 0$
	Solves to find the value of one unknown	**M1**	**FT** *their* linear equations in a and b oe OR compares coefficients to state a value of a or b
	$a = -5$, $b = 8$	**A1**	
	[p(1)=] $1 + a + b + c = -5$ oe, soi	**M1**	
	$[1 - 5 + 8 + c = -5]$ $c = -9$	**A1**	

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Question	Answer	Marks	Partial Marks
6(b)(ii)	$[p''(x) =] 6x + 2(their\ a)$ soi	**M1**	**FT** *their a*
	6(2) – 10 = 2 > 0 [therefore minimum]	**A1**	
7(a)	$\frac{1}{2} \times 9^2 \times \theta - \frac{1}{2} \times 5^2 \times \theta = 4\pi$ oe, soi	**M2**	**M1** for $\frac{1}{2} \times 9^2 \times \theta$ or $\frac{1}{2} \times 5^2 \times \theta$ oe, soi
	$\theta = \frac{\pi}{7}$ oe or 0.449 or 0.4487 to 0.4488	**A1**	
7(b)	[Arc AD =] $\frac{5\pi}{7}$	**2**	**M1** for [Arc AD =] $5 \times their \frac{\pi}{7}$ **FT** any stated value of θ from **(a)**
	[AC =] 4.991[27...] rot to 4 or more sf	**2**	**M1** for $[AC^2 =] 9^2 + 5^2 - 2(9)(5)\cos\left(their \frac{\pi}{7}\right)$ **FT** *their* θ providing $0 < \theta < \frac{\pi}{2}$
	11.2 or 11.23[526...] rot to 4 or more sf	**A1**	
8	$\int \cos\left(4x - \frac{\pi}{4}\right) dx = \frac{1}{4}\sin\left(4x - \frac{\pi}{4}\right)(+c)$	**B2**	**B1** for $k\sin\left(4x - \frac{\pi}{4}\right)$ where $k > 0$ or $k = -\frac{1}{4}$
	$\frac{3}{4} = \frac{1}{4}\sin\left(4\left(\frac{3\pi}{16}\right) - \frac{\pi}{4}\right) + c$	**M1**	**FT** *their k* providing **B1** awarded
	$-\frac{1}{16}\cos\left(4x - \frac{\pi}{4}\right) + \frac{1}{2}x \quad (+A)$	**2**	**M1 FT** for $m\cos\left(4x - \frac{\pi}{4}\right) + \left(their \frac{1}{2}\right)x \quad (+A)$ **FT** $their\ k\sin\left(4x - \frac{\pi}{4}\right) + their\ c$ providing at least **B1 M1** awarded
	$y = -\frac{1}{16}\cos\left(4x - \frac{\pi}{4}\right) + \frac{1}{2}x + \frac{5\pi}{32}$ oe, cao	**2**	**M1 FT** for $\frac{\pi}{4} = -\frac{1}{16}\cos\left(\frac{3\pi}{4} - \frac{\pi}{4}\right) + \frac{1}{2}\left(\frac{3\pi}{16}\right) + A$ **FT** $(their\ m)\cos\left(4x - \frac{\pi}{4}\right) + \left(their \frac{1}{2}\right)x + A$ providing previous **M1** awarded

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