Question	Answer	Marks	Partial marks
8(a)	$[x =]\ \frac{\pi}{24}, \frac{5\pi}{24}$ and no extras in range	**2**	**B1** for $[x =]\ \frac{\pi}{24}$ or $\frac{5\pi}{24}$ ignoring extras or for $4x = \frac{\pi}{6}$ **and** $\frac{5\pi}{6}$ soi
8(b)	Correct and complete plan soi e.g. $\int_{their\frac{\pi}{24}}^{their\frac{5\pi}{24}}\left(\sin(4x)-\frac{1}{2}\right)\mathrm{d}x$ or $2\int_{their\frac{\pi}{24}}^{\frac{\pi}{8}}\left(\sin(4x)-\frac{1}{2}\right)\mathrm{d}x$	**M1**	**FT** *their* limits in radians from part (a) or $\int_{their\frac{\pi}{24}}^{their\frac{5\pi}{24}}\sin 4x\,\mathrm{d}x\ -\frac{1}{2}\left(their\frac{5\pi}{24}-their\frac{\pi}{24}\right)$
	Integrates sin 4*x*: $-\frac{1}{4}\cos 4x$	**B2**	**B1** for $k\cos 4x$ where $k < 0$ or $k = \frac{1}{4}$
	Substitutes exact limits in correct order: $-\frac{1}{4}\cos 4\left(\frac{5\pi}{24}\right)-\left[-\frac{1}{4}\cos 4\left(\frac{\pi}{24}\right)\right]$ oe soi	**M1**	**FT** *their* exact limits and *their* $-\frac{1}{4}\cos 4x$ providing at least **B1** awarded
	$\frac{\sqrt{3}}{4}-\frac{\pi}{12}$ or exact equivalent	**A1**	
9	$\frac{18+12\sqrt{10}}{2+\sqrt{10}}$	**B1**	
	$\frac{their18+(their12)\sqrt{10}}{2+\sqrt{10}}\times\frac{2-\sqrt{10}}{2-\sqrt{10}}$	**M1**	**FT** $\frac{a+b\sqrt{10}}{2+\sqrt{10}}$ where *a* and *b* are integers
	$\frac{36-18\sqrt{10}+24\sqrt{10}-120}{-6}$	**A1**	
	$14-\sqrt{10}$ nfww	**A1**	**dep** on all previous marks awarded
	Alternative		
	$\frac{16+11\sqrt{10}}{2+\sqrt{10}}\times\frac{2-\sqrt{10}}{2-\sqrt{10}}$ [+1]	**(M1)**	
	$\frac{32-16\sqrt{10}+22\sqrt{20}-110}{-6}$ [+1]	**(A1)**	
	$\frac{-78+6\sqrt{10}\ [-6]}{-6}$ oe	**(A1)**	e.g. $13-\sqrt{10}$ [+1]
	$14-\sqrt{10}$ nfww	**(A1)**	**dep** on all previous marks awarded

© Cambridge University Press & Assessment 2024