Question	Answer	Marks	Partial Marks
10(b)(i)	$\frac{\mathrm{d}(\sin 4x)}{\mathrm{d}x} = 4\cos 4x$ soi	**B1**	
	Applies correct form of product rule: $4x\cos 4x + [1]\sin 4x$ isw	**B1**	**FT** *their* $4\cos 4x$ if possible
10(b)(ii)	$\left[\int (4x\cos 4x)\,\mathrm{d}x = \right] x\sin 4x - \int \sin 4x\,\mathrm{d}x$	**M1**	**FT** use of *their* $mx\cos 4x + n\sin 4x$ where m and n are constants
	$x\sin 4x + \frac{1}{4}\cos 4x[+c]$ soi	**A1**	
	$\frac{\pi}{3}\sin\left(4\times\frac{\pi}{3}\right)+\frac{1}{4}\cos\left(4\times\frac{\pi}{3}\right)-$ $\left[\frac{\pi}{4}\sin\left(4\times\frac{\pi}{4}\right)+\frac{1}{4}\cos\left(4\times\frac{\pi}{4}\right)\right]$	**A1**	
	Correct completion to **given answer** $\frac{1}{8}-\frac{\pi\sqrt{3}}{6}$	**A1**	
11(a)	$500 = \frac{4}{6}\pi x^3 + \pi x^2 y$ oe	**M1**	
	$y = \frac{1}{\pi x^2}\left(500 - \frac{4}{6}\pi x^3\right)$ oe, isw	**A1**	if first **M0**, **SC1** for $y = \frac{1}{\pi x^2}\left(500 - \frac{4}{3}\pi x^3\right)$ oe seen
	$S = 2\pi x^2 + \pi x^2 + 2\pi x\left(\frac{500}{\pi x^2} - \frac{2}{3}x\right)$	**M1**	**dep** on first **M1**
	Correct completion to given answer: $S = \frac{5}{3}\pi x^2 + \frac{1000}{x}$	**A1**	
11(b)	Differentiates S: $\frac{10}{3}\pi x - \frac{1000}{x^2}$ oe	**B2**	**B1** for each term
	$\frac{10}{3}\pi x - \frac{1000}{x^2} = 0$ and attempt to solve	**M1**	**FT** *their* $\frac{\mathrm{d}S}{\mathrm{d}x}$ providing at least **B1** awarded
	$x = \sqrt[3]{\frac{300}{\pi}}$ isw or 4.57[07...] nfww	**A1**	
12(a)(i)	$A(0,1)$ and $B(1, 0)$	**B1**	