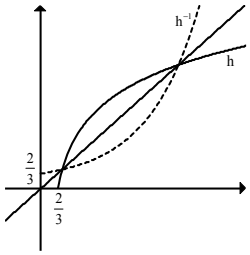
Question	Answer	Marks	Partial Marks
10(b)	Correct graph for h	**B1**	
	h^{-1} the reflection of h in $y = x$	**B1**	**FT** *their* h
	Both graphs drawn over the correct domain	**B1**	**FT** *their* h and h^{-1}
		**B1**	Correct graphs intersecting twice
11	$h = \frac{1000}{\pi r^2}$ or $r = \sqrt{\frac{1000}{\pi h}}$ soi	**B1**	
	$S = \pi r^2 + 2\pi r\left(\frac{1000}{\pi r^2}\right)$ oe or $S = \pi\left(\frac{1000}{\pi h}\right) + 2\pi\sqrt{\frac{1000}{\pi h}}(h)$ oe	**M1**	
	$S = \pi r^2 + 2\left(\frac{1000}{r}\right)$ or better or $S = \frac{1000}{h} + 2\pi\sqrt{\frac{1000}{\pi}}\left(h^{\frac{1}{2}}\right)$	**A1**	
	$\frac{dS}{dr} = 2\pi r - 2000r^{-2}$ or $\frac{dS}{dh} = -1000h^{-2} + \sqrt{1000\pi}\,h^{-\frac{1}{2}}$	**B2**	**B1 FT** for each term correct
	$\frac{dS}{dr} = 0, \quad r^3 = \frac{1000}{\pi}$ oe or $\frac{dS}{dh} = 0, \quad h^{\frac{3}{2}} = \sqrt{\frac{1000}{\pi}}$ oe	**M1**	
	$S = \pi\left(\sqrt[3]{\frac{1000}{\pi}}\right)^2 + \frac{2000}{\sqrt[3]{\frac{1000}{\pi}}}$ or $S = \frac{1000}{\sqrt[3]{\frac{1000}{\pi}}} + 2\sqrt{1000\pi}\left(\sqrt[3]{\frac{1000}{\pi}}\right)^{\frac{1}{2}}$	**M1**	
	439 or 439.3 to 439.4	**A1**	

Question	Answer	Marks	Partial Marks
12(a)	$v = -6t + c$ soi	**B1**	
	$v = -6t + 18$	**M1**	
	$-6t + 18 = 0$, $t = 3$	**A1**	
12(b)	$s = \frac{-6t^2}{2} + 18t$ soi	**B1**	
	$\left(-3(3)^2 + 18(3)\right) - \left(-3(2)^2 + 18(2)\right)$	**M1**	**FT** *their s* provided it is from an attempt to integrate
	3 (metres)	**A1**	Not from wrong working
13(a)(i)	$a + ar = 10$ soi	**B1**	
	$ar^2 = 9$ soi	**B1**	
	Solves *their* equations	**M1**	
	$r = -\frac{3}{5}, \frac{3}{2}$ and $a = 25, 4$	**A2**	**A1** for either $r = -\frac{3}{5}, \frac{3}{2}$ or $a = 25, 4$ or for $r = -\frac{3}{5}$ **and** $a = 25$ or for $r = \frac{3}{2}$ **and** $a = 4$
13(a)(ii)	$\frac{125}{8}$ or 15.625 or $15\frac{5}{8}$ only	**B1**	