Question	Answer	Marks	Guidance
9(b)(ii)	$\frac{1}{2} \times 5^2 \times$ *their* 1.85	**M1**	**FT** *their* 1.85 providing it is less than 2π
	Correct plan e.g. $\left[2 \times \frac{1}{2} \times\right] 5^2$ (*their* 1.85– sin(*their* 1.85)	**M1**	**dep** previous **M1**
	22.4 or 22.21 to 22.38 nfww	**A1**	
10	$n = 7$ soi	**B1**	
	$5 \times \frac{7 \times 6}{2} \times 2^5 \times a^2 = 30240$ oe	**B1**	
	$5 \times 7 \times 2^6 \times a = b^2$	**B1**	
	$a = 3$ only, nfww	**B1**	
	$b = \pm\sqrt{6720}$ oe, isw, nfww	**B1**	
			If first **B1** only scored then **SC1** for $a = 3\sqrt{5}$ or $\sqrt{45}$ or 6.71 or 6.708[2…] only and **SC1** for $b = \pm\sqrt{1344\sqrt{5}}$ or ±54.8[2…]
11(a)	Correct use of $\pi r^2 h = 330$ to find an expression that can be used to eliminate h e.g. $h = \frac{330}{\pi r^2}$ or $\pi r h = \frac{330}{r}$	**M2**	**M1** for $\pi r^2 h = 330$ soi
	Correct substitution and completion to given answer e.g. $2\pi r^2 + 2\pi r \times \frac{330}{\pi r^2} = 2\pi r^2 + \frac{660}{r}$	**A1**	

Question	Answer	Marks	Guidance
11(b)	Correct derivative: $4\pi r - 660r^{-2}$, isw	**B2**	**B1** for one correct term
	$4\pi r - \frac{660}{r^2} = 0$ and solves for r	**M1**	**FT** *their* derivative providing that at least one term is correct
	$r = \sqrt[3]{\frac{660}{4\pi}}$ oe, isw or 3.74 or 3.744[94…] rot to 3 or more dp	**A1**	
	Second derivative $\frac{d^2S}{dr^2} = 4\pi + 1320r^{-3}$ **and** When $r = 3.74$, $\frac{d^2S}{dr^2} > 0$ oe [hence minimum] or $\frac{d^2S}{dr^2} = 12\pi$ or 37 to 38 [hence minimum] or as $r > 0$, $\frac{d^2S}{dr^2} > 0$ [hence minimum] OR correctly finds the values of the first derivative at 3.74 oe $\pm h$, where h is small [hence minimum]	**A1**	**dep** on previous mark
12(a)	$\begin{pmatrix} 5\sqrt{3}\cos 60 \\ 5\sqrt{3}\sin 60 \end{pmatrix}$ oe or $\begin{pmatrix} \frac{5\sqrt{3}}{2} \\ \frac{15}{2} \end{pmatrix}$ oe $\begin{pmatrix} 10\cos 30 \\ 10\sin 30 \end{pmatrix}$ oe or $\begin{pmatrix} 5\sqrt{3} \\ 5 \end{pmatrix}$ oe	**2**	**B1** for each or for correct components not stated in vector form