Question	Scheme	Marks	AOs
2(a)(i)	$a\cos^2\dfrac{\pi}{3}=1\Rightarrow a=...$ or $a\cos^2\dfrac{\pi}{6}=3\Rightarrow a=...$	M1	3.4
	$a=4$	A1	2.2b
(ii)	$b\tan\dfrac{\pi}{3}-b\tan\dfrac{\pi}{6}=2\Rightarrow b=...$	M1	3.4
	$b=\sqrt{3}$	A1	2.2b
		(4)	
(b)	$V=\pi\displaystyle\int x^2\,\mathrm{d}y=\pi\int 16\cos^4\theta\times\sqrt{3}\sec^2\theta\,\mathrm{d}\theta$	M1	3.4
	$=16\pi\sqrt{3}\displaystyle\int\cos^2\theta\,\mathrm{d}\theta$	A1	1.1b
	$=16\pi\sqrt{3}\displaystyle\int\dfrac{\cos 2\theta+1}{2}\,\mathrm{d}\theta$	M1	3.1a
	$=8\pi\sqrt{3}\left[\dfrac{1}{2}\sin 2\theta+\theta\right]$	A1	1.1b
	$=8\pi\sqrt{3}\left[\dfrac{1}{2}\sin 2\theta+\theta\right]_{\frac{\pi}{6}}^{\frac{\pi}{3}}=8\pi\sqrt{3}\left(\dfrac{\sqrt{3}}{4}+\dfrac{\pi}{3}-\dfrac{\sqrt{3}}{4}-\dfrac{\pi}{6}\right)$	M1	3.4
	$=\dfrac{4\pi^2\sqrt{3}}{3}=22.8\ \text{cm}^3$	A1	1.1b
		(6)	
		(10 marks)	

Notes

(a)

M1: Interprets the information from the model and uses the parametric form of x to determine the value of a

A1: Correct value for a

M1: Interprets the information from the model and uses the parametric form of y to find b

A1: Correct value for b

(b)

M1: Uses the correct volume of revolution formula and the parametric equations for the model

A1: Correct simplified integral

M1: Uses a correct double angle identity on the integrand to achieve a suitable form for integration

A1: Correct integration

M1: Correct use of correct limits according to the model

A1: Correct volume (allow exact or awrt 22.8)