Question Number	Scheme	Marks
3	$x=1,\ y^2=4 \Rightarrow y=\pm 2$	B1
	$\text{Volume} = \pi\int_{-2}^{2}\left(5-y^2\right)\,\mathrm{d}y - \pi\int_{-2}^{2}1\,\mathrm{d}y, = (\pi)\left(\left[5y-\frac{y^3}{3}\right]_{-2}^{2}-[y]_{-2}^{2}\right)$	M1,M1
	$=(\pi)\left\{\left(10-\frac{8}{3}\right)-\left(-10-\frac{-8}{3}\right)-(2--2)\right\}=\frac{32\pi}{3}\ \ (\text{units}^3)$	dM1A1cao
ALT	B1 Limits as above	
	$\text{Volume} = \pi\int_{-2}^{2}\left(5-y^2\right)\,\mathrm{d}y - \pi\times 1\times 4 = \pi\left[5y-\frac{y^3}{3}\right]_{-2}^{2}-4\pi$ M1M1	
	$=\pi\left\{\left(10-\frac{8}{3}\right)-\left(-10-\frac{-8}{3}\right)\right\}-4\pi=\frac{32\pi}{3}\ \ (\text{units}^3)$ M1A1	
		[5]

	Notes cover either method
B1	Correct y coords for points of intersection (shown explicitly or only seen as limits)
M1	Use $\pi\int x^2\mathrm{d}y$ for volume of curve, with an attempt to obtain an integrand in terms of y, and cylinder by integral or standard volume formula. This mark can only be awarded when evidence of a **difference** of these volumes is seen. Limits not needed.
M1	Attempt the integration of their dimensionally correct curve integral. (ie not squared). Integration must be wrt y. Limits and π not needed. **Algebraic integration must be seen.**
dM1	Substitute their limits in their integrated function and obtain a value for the volume of the cylinder using consistent values. π not needed. Depends on 2nd M mark (but not first)
A1cao	Correct volume (as shown or equivalent multiple of π eg 10.7π) **NB:** All marks are available if work is done without π but π included in the final answer.