

Solutions in Quiz05

1. $V = \int_{-1}^1 \pi[(2 + \sqrt{1 - y^2})^2 - (2 - \sqrt{1 - y^2})^2]dy = 8\pi \int_{-1}^1 \sqrt{1 - y^2}dy = 8\pi \times \frac{\pi}{2} = 4\pi^2.$
2. $S = \int_{-1}^1 2\pi(2 + \sqrt{1 - y^2})\sqrt{1 + \frac{y^2}{1 - y^2}}dy + \int_{-1}^1 2\pi(2 - \sqrt{1 - y^2})\sqrt{1 + \frac{y^2}{1 - y^2}}dy$
 $= 8\pi \int_{-1}^1 \frac{1}{\sqrt{1 - y^2}}dy = 8\pi^2.$
3. $\frac{dy}{dx} = \sqrt{\cos x},$
 $L = \int_0^{\frac{\pi}{2}} \sqrt{1 + \cos x}dx = \int_0^{\frac{\pi}{2}} \sqrt{2}|\cos \frac{x}{2}|dx = 2.$
4. $e^y \frac{dy}{dx} = 3x^2 \Rightarrow e^y = x^3 + C$ for some constant $C.$
5. $\frac{d}{dx}(xy) = x \frac{dy}{dx} + y = e^x \Rightarrow xy = e^x + C$ for some constant $C,$
 $y(1) = 1 \Rightarrow y = \frac{1}{x}(e^x + 1 - e).$