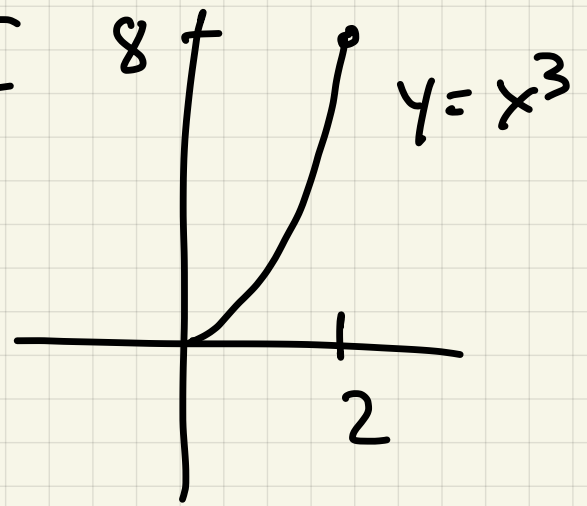


Quiz 5



① Arc length:

$$\frac{dy}{dx} = 3x^2 = r$$

$$ds = \sqrt{1 + (3x^2)^2} dx$$

$$\Rightarrow L = \int_0^2 \sqrt{1 + 9x^4} dx$$

② SA about z-axis

Radius of strip = $y = x^3$

$$SA = \int_0^2 2\pi x^3 \sqrt{1 + 9x^4} dx$$

$$u = 1 + 9x^4$$

$$du = 36x^3 dx$$

$$\frac{du}{36} = x^3 dx$$

$$\int_{u=1}^{u=37} \frac{2\pi}{36} \sqrt{u} du =$$

$$\frac{\pi}{18} \left[\frac{2}{3} u^{3/2} \right]_1^{37} =$$

$$\frac{\pi}{27} (37\sqrt{37} - 1)$$