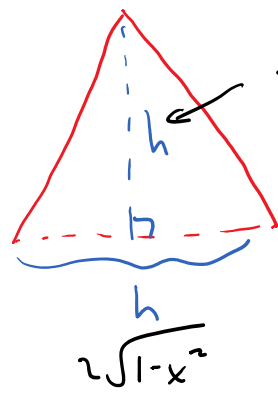
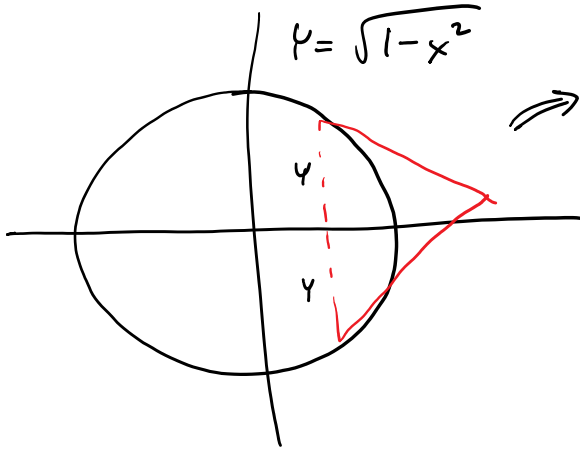


6.2

Wednesday, June 5, 2019 12:25 PM

The base of a solid is the unit circle $x^2 + y^2 = 1$. Cross-sections \perp to x -axis are Δ 's with height = base. Find the volume.



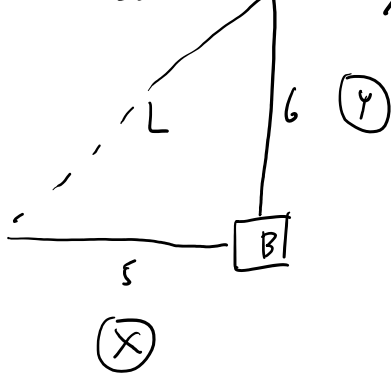
Area of $\Delta = 2(1-x^2)$

$$2 \int_{-1}^1 (1-x^2) dx =$$

A train approaches Boise from the west at 50 mph. It is 5 miles from Boise.

A second train heads north out of Boise at 60 mph. It is 6 miles north.

How quickly is the distance between them changing?



$$L = \sqrt{25 + 36} = \sqrt{61}$$

$$\frac{d}{dt} (x^2 + y^2 = L^2)$$

$$2x \frac{dx}{dt} + 2y \frac{dy}{dt} = 2L \frac{dL}{dt}$$

$$5(-50) + 6(60) = \sqrt{61} \frac{dL}{dt}$$

$$\frac{110}{\sqrt{61}} = \frac{dL}{dt}$$

9.1

$$\sqrt{1-x^2} \frac{dy}{dx} = y$$

$$\left(\frac{\sqrt{2}}{2}, 1\right)$$

$$\int \frac{dy}{y} = \int \frac{dx}{\sqrt{1-x^2}}$$

$$\ln y = \sin^{-1} x + c$$

$$y = e^{\sin^{-1} x + c} = e^{\sin^{-1} x} e^c$$

$$1 = C e^{\sin^{-1} \frac{\sqrt{2}}{2}} = C e^{\pi/4} \quad C = e^{-\pi/4}$$

$$y = e^{-\pi/4} e^{\sin^{-1} x}$$