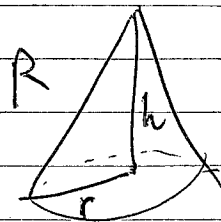
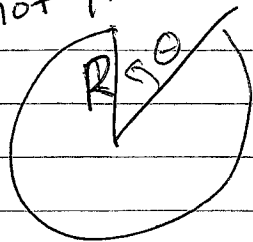


$R = 20$ in
(not that we care)

4.4.21



$$2\pi r = \frac{2\pi - \theta}{2\pi} 2\pi R$$

$$r = \left(1 - \frac{\theta}{2\pi}\right) R$$

$$r^2 + h^2 = R^2$$
$$V = \frac{1}{3} \pi r^2 h$$
$$r^2 = R^2 - h^2$$

$$V = \frac{1}{3} \pi (R^2 - h^2) h$$

$$= \frac{1}{3} \pi R^2 h - \frac{1}{3} \pi h^3$$

$$V'(\theta) = \frac{1}{3} \pi R^2 \frac{dh}{d\theta} - \frac{1}{3} \pi 3h^2 \frac{dh}{d\theta} = 0$$

(Divide through by $\frac{1}{3} \pi \frac{dh}{d\theta}$ here)

$$R^2 - 3h^2 = 0 \Rightarrow h^2 = \frac{1}{3} R^2$$

$$r^2 = R^2 - h^2 = R^2 - \frac{1}{3} R^2 = \frac{2}{3} R^2$$

$$\left(1 - \frac{\theta}{2\pi}\right)^2 R^2 = \frac{2}{3} R^2$$

Critical Point

$$1 - \frac{\theta}{2\pi} = \sqrt{\frac{2}{3}} = \frac{\sqrt{6}}{3} \Rightarrow \theta = 2\pi \left(1 - \frac{\sqrt{6}}{3}\right)$$