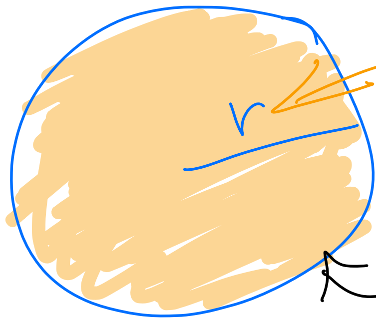
Geometric things to know

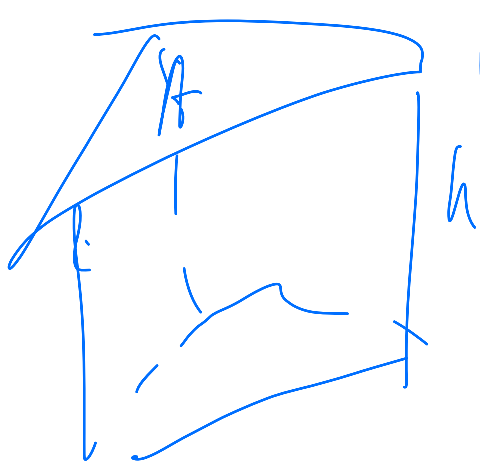


Area $= \pi r^2$

circumference $= 2\pi r$

$V = lwh$

Volume $= Ah$



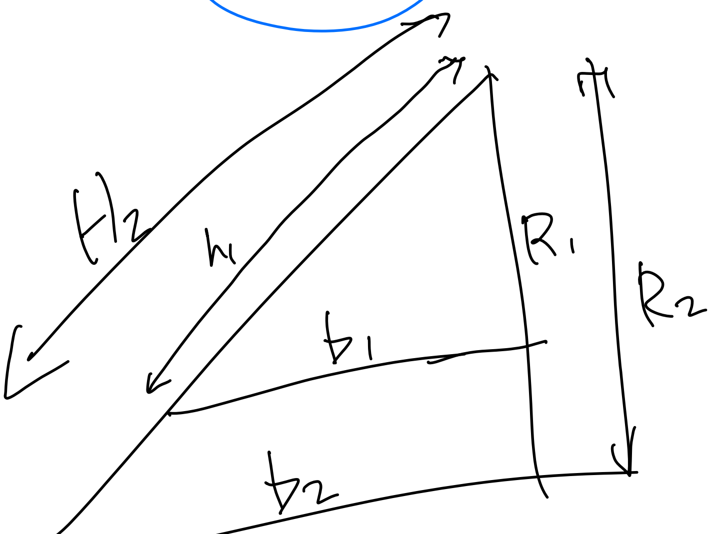
Volume $= Ah$

Volume $= \frac{1}{3} A h$

Volume $= \frac{1}{3} \pi r^2 h$

Volume $= \frac{4}{3} \pi r^3$

Surface Area $= 4 \pi r^2$



Similar triangles

$$\frac{b_1}{b_2} = \frac{R_1}{R_2} = \frac{h_1}{H_2}$$

Geometric Series:

Sum $\overset{k=0}{a} + \overset{k=1}{ar} + \overset{k=2}{ar^2} + \dots + ar^N$

$$= \sum_{k=0}^{N} ar^k = \frac{a(1-r^{N+1})}{1-r}$$

$$\frac{1}{3} + \frac{1}{3^2} + \frac{1}{3^3} + \dots + \frac{1}{3^N}$$

geometric series
$a = \frac{1}{3}$, $r = \frac{1}{3}$

$$\text{Sum} = \frac{a(1-r^{N+1})}{1-r} = \frac{\frac{1}{3}\left(1-\left(\frac{1}{3}\right)^{N+1}\right)}{\left(1-\frac{1}{3}\right)}$$

$$= \frac{3 \cdot \frac{1}{3}\left(1-\left(\frac{1}{3}\right)^{N+1}\right)}{3 \cdot \frac{2}{3}} = \boxed{\frac{1-\left(\frac{1}{3}\right)^{N+1}}{2}}$$

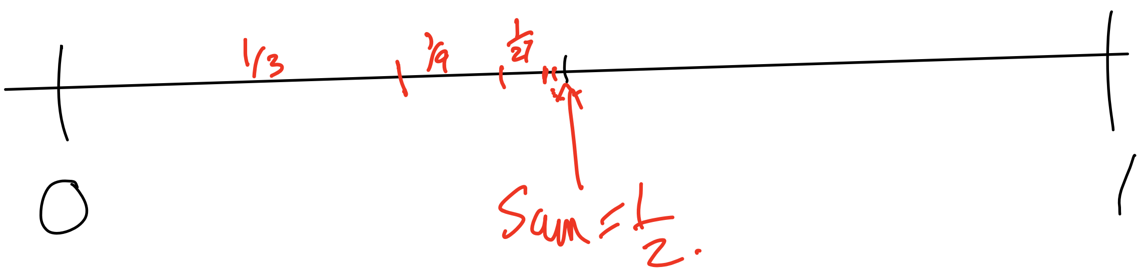
Sum of infinite geometric series

$$\frac{1}{3} + \frac{1}{3^2} + \frac{1}{3^3} + \dots$$

$$= \lim_{N\to\infty} \left(\frac{1}{3} + \frac{1}{3^2} + \frac{1}{3^3} + \dots + \frac{1}{3^N} \right)$$

$$= \lim_{N\to\infty} \frac{\frac{1}{3}\left(1-\left(\frac{1}{3}\right)^{N+1}\right)}{1-\frac{1}{3}}$$

$$= \lim_{N\to\infty} \frac{1-\left(\frac{1}{3}\right)^{N+1}}{2} = \boxed{\frac{1}{2}}$$



Next time (after you make 100% on the test)