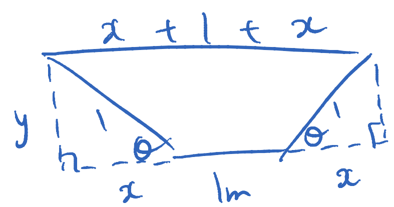
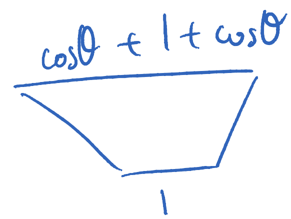
# 5.4_12

June-12-13
1:08 PM




$\frac{x}{1} = \cos\theta$

$\frac{y}{1} = \sin\theta$

domain $\theta \in (0, 90^\circ)$ $\left(0, \frac{\pi}{2}\right)$

$A_{\text{trap}} = \frac{h}{2}(b_1 + b_2)$

$= \frac{\sin\theta}{\cancel{2}}(\cancel{2}^{1} + \cancel{2}\cos\theta)$

$A = \sin\theta(1 + \cos\theta)$

MAX. $\boxed{A = \sin\theta + \sin\theta\cos\theta}$

crit. pt: $A' = \cos\theta + \cos\theta\cos\theta + \sin\theta(-\sin\theta)$

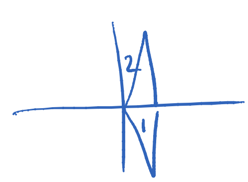
$0 = \cos\theta + \underbrace{\cos^2\theta - \sin^2\theta}_{\text{identity}}$

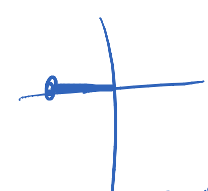
$0 = \cos\theta + 2\cos^2\theta - 1$

$0 = 2\cos^2\theta + \cos\theta - 1$

$0 = (2\cos\theta - 1)(\cos\theta + 1)$

$\cos\theta = \frac{1}{2}$ or $\cos\theta = -1$



$\theta = 180^\circ = \pi$

$\theta = 60^\circ = \pi/3$

or $\theta = 330^\circ = \frac{5\pi}{3}$

∴ $(\theta = \pi/$ ... → in domain

only $\theta = \pi/3$ is in domain

**show max:**

| | $0$ | | $60^\circ$ $\pi/3$ | | $90^\circ$ $\pi/2$ |
|---|---|---|---|---|---|
| $2\cos\theta - 1$ | | $+$ | | $-$ | |
| $\cos\theta + 1$ | | $+$ | | $+$ | |
| $A'$ | | $+$ | | $-$ | |
| $A$ | | $\nearrow$ | | $\searrow$ | |

$\therefore$ max at $\theta = \pi/3$

**answer question:**

the angle that will max area is $60^\circ$ or $\pi/3$