

5. Find an angle θ , $0 < \theta < \frac{\pi}{2}$, which increases twice as fast as its sine.

Sol. Let θ increases twice as fast as its sine.

$$\Rightarrow \frac{d\theta}{dt} = 2 \frac{d(\sin \theta)}{dt}$$

$$\Rightarrow \frac{d\theta}{dt} = 2 \cdot \cos \theta \cdot \frac{d\theta}{dt}$$

$$\Rightarrow 1 = 2 \cos \theta$$

$$\Rightarrow \frac{1}{2} = \cos \theta \quad \Rightarrow \quad \theta = \frac{\pi}{3}$$