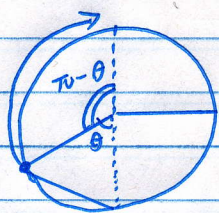


- ④ A man wishes to get from an initial point on the shore of a circular pond with radius 1m to a point on the shore directly opposite (on the other side of the diameter) He plans to swim from the initial point to another point on the shore and then walk along the shore to the terminal point.

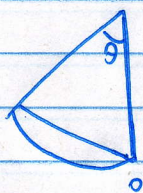
a) If he swims at 2m/hr and walks at 4m/hr what are the minimum & maximum times for the trip?



$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Ans $\theta = 0 \Rightarrow$ entire distance covered by walking
 $\theta = \pi \Rightarrow$ — " — " — " — " swimming.

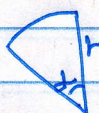
Objective: Treat time as a function of θ . Find max & min.



$$\text{length of chord } A = 2 \cdot r \cdot \sin \frac{\theta}{2}$$

$$\begin{aligned} \text{length swim} &= 2 \cdot r \cdot \left(\sin \frac{\theta}{2} \right) \quad \text{let } r = 1\text{m} \\ &= 2 \sin \end{aligned}$$

$$\text{Time of the swimming pool} = \frac{\text{distance}}{\text{speed}} = \frac{2 \sin \frac{\theta}{2}}{2} = \sin \frac{\theta}{2}$$



$$\text{radius angle} = r \cdot \alpha$$

$$\text{Length walked} = \text{radius angle} = 1(\pi - \theta) = (\pi - \theta)$$

$$\text{time taken for walking past} = \frac{\text{distance}}{\text{speed}}$$

$$= \frac{\pi - \theta}{4}$$