

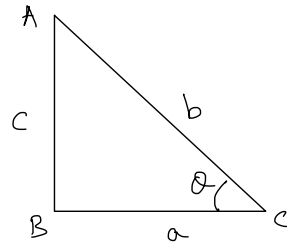
Trigonometry 1

19 October 2024 18:58

$$\sin(\theta) = \frac{c}{b} = \frac{1}{\csc \theta}$$

$$\cos(\theta) = \frac{a}{b} = \frac{1}{\sec \theta}$$

$$\tan(\theta) = \frac{c}{a} = \frac{\sin(\theta)}{\cos(\theta)} = \frac{1}{\cot \theta}$$



$$\sin^2 \theta + \cos^2 \theta = 1$$

$$1 + \tan^2 \theta = \sec^2 \theta$$

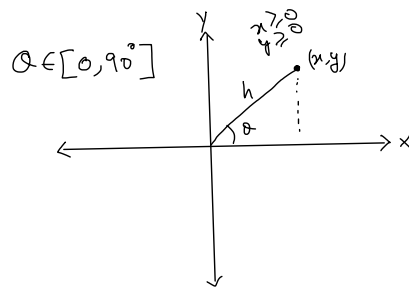
$$1 + \cot^2 \theta = \csc^2 \theta$$

$$h = \sqrt{x^2 + y^2} > 0$$

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

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

$$\tan \theta = \frac{y}{x}$$



\Rightarrow

$$0 \leq \sin \theta \leq 1$$

$$0 \leq \cos \theta \leq 1$$

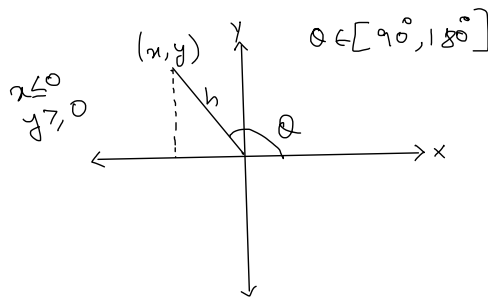
$$0 \leq \tan \theta < \infty$$

$\tan(90^\circ)$ is undefined

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

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

$$\tan \theta = \frac{y}{x}$$



$$0 \leq \sin \theta \leq 1$$

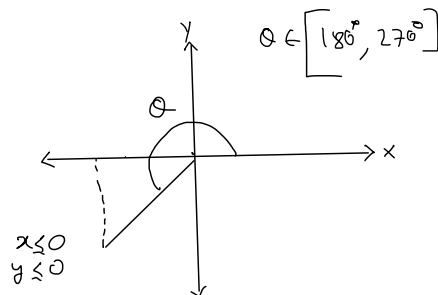
$$-1 \leq \cos \theta \leq 0$$

$$-\infty < \tan \theta \leq 0$$

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

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

$$\tan \theta = \frac{y}{x}$$



$$-1 \leq \sin \theta \leq 0$$

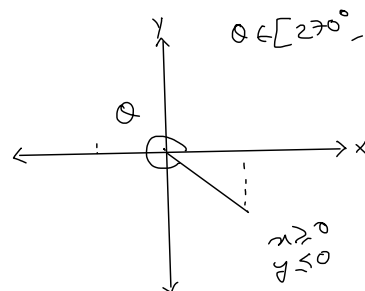
$$-1 \leq \cos \theta \leq 0$$

$$0 \leq \tan \theta < \infty$$

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

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

$$\tan \theta = \frac{y}{x}$$



$$-1 \leq \sin \theta \leq 0$$

$$0 \leq \cos \theta \leq 1$$

$$-\infty < \tan \theta \leq 0$$

range

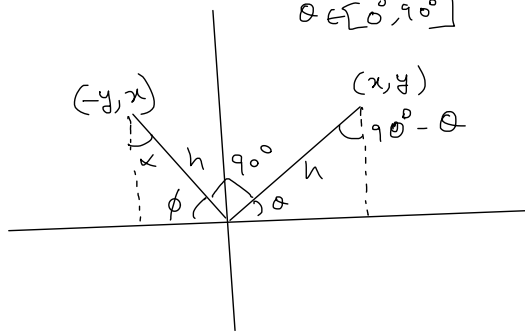
Homework: Find n for $\csc \theta$, $\sec \theta$ and $\cot \theta$ for θ in all four quadrants.

$$\theta \in [0^\circ, 90^\circ]$$

$$\sin(\theta + 90^\circ) = \frac{x}{h} = \cos \theta$$

$$\cos(\theta + 90^\circ) = \frac{-y}{h} = -\sin \theta$$

$$\tan(\theta + 90^\circ) = -\frac{x}{y} = -\cot \theta$$



$$\phi = 90^\circ - \theta$$

$$\alpha = \theta$$

HomeWork :- Do this for $\theta \in [90^\circ, 180^\circ]$, $\theta \in [180^\circ, 270^\circ]$, $\theta \in [270^\circ, 360^\circ]$

Also repeat it to find $\sin(\theta + \gamma)$, $\cos(\theta + \gamma)$, $\tan(\theta + \gamma)$ for $\gamma = 180^\circ, 270^\circ, 360^\circ$ for $\theta \in \{\text{all four quadrants}\}$.