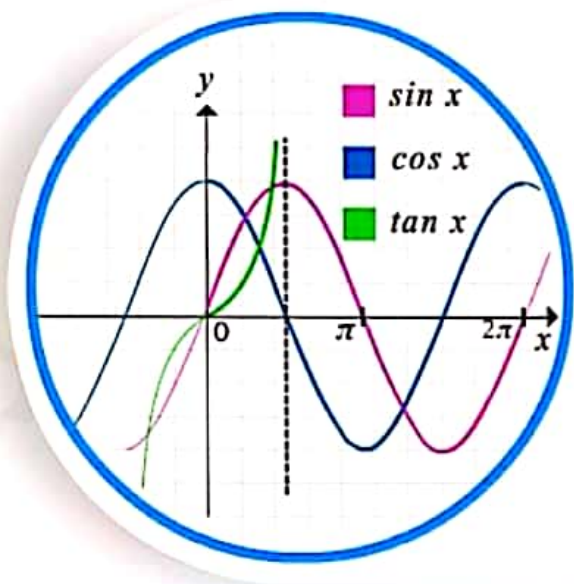


TRIGONOMETRIC EQUATION



Principal Solution

The solutions of a trigonometric equation which lie in the interval $[0, 2\pi]$ are called principal solutions.

Eg: $\sin x = \frac{1}{2} \Rightarrow x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{9\pi}{6}, \dots$

But, principal solution of

$\sin x = \frac{1}{2}$ are $\frac{\pi}{6}, \frac{5\pi}{6} \in [0, 2\pi]$

General Solution

$\sin \theta = \sin \alpha \Rightarrow \theta = n\pi + (-1)^n \alpha, \alpha \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right], n \in \mathbb{I}$

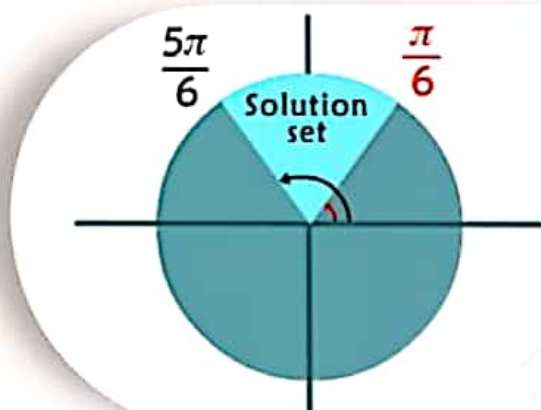
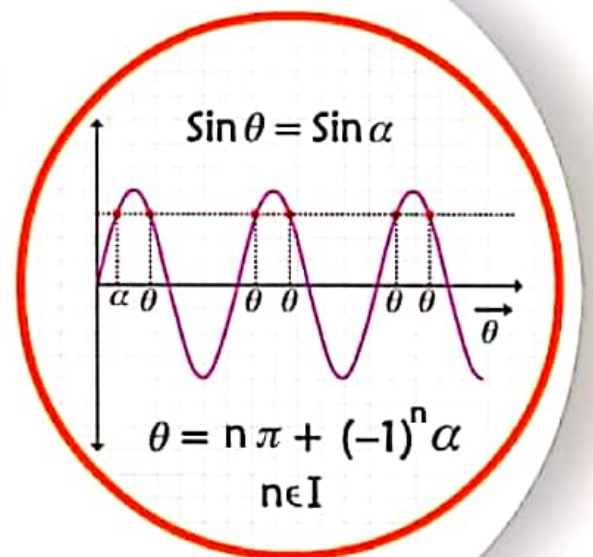
$\cos \theta = \cos \alpha \Rightarrow \theta = 2n\pi \pm \alpha, \alpha \in [0, \pi], n \in \mathbb{I}$

$\tan \theta = \tan \alpha \Rightarrow \theta = n\pi + \alpha, \alpha \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right), n \in \mathbb{I}$

$\sin^2 \theta = \sin^2 \alpha \Rightarrow \theta = n\pi \pm \alpha, n \in \mathbb{I}$

$\cos^2 \theta = \cos^2 \alpha \Rightarrow \theta = n\pi \pm \alpha, n \in \mathbb{I}$

$\tan^2 \theta = \tan^2 \alpha \Rightarrow \theta = n\pi \pm \alpha, n \in \mathbb{I}; \alpha$ is called one principal angle.



Trigonometric Inequalities

Eg: $\sin x > \frac{1}{2} \Rightarrow \frac{\pi}{6} < x < \frac{5\pi}{6}$