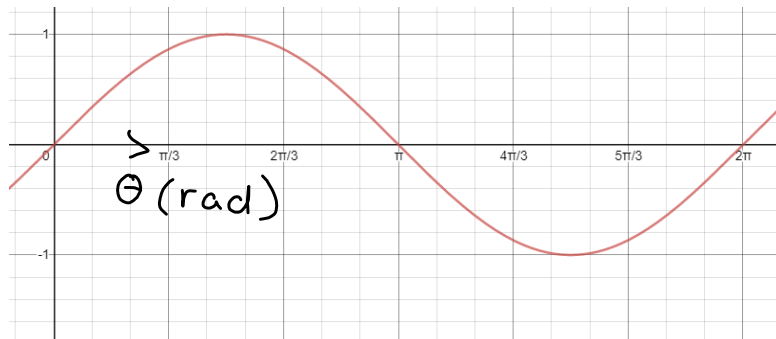


Basic Sine Function

- Periodic function (repeats after 2π)
- Range $[-1, 1]$
- Domain : \mathbb{R}



Zeros :

$$[\pi + 2\pi n] \cup [2\pi + 2\pi n]$$

$$n \in \mathbb{Z}$$

period: 2π

Variation:

$$\uparrow f(x) : x \in [0, \frac{\pi}{2}] \cup [\frac{3\pi}{2}, 2\pi]$$

$$\downarrow f(x) : x \in [\frac{\pi}{2}, \frac{3\pi}{2}]$$

signs:

over
 $[0, 2\pi]$

$$\sin x \geq 0 : \text{if } x \in [0, \pi]$$

$$\sin x \leq 0 \text{ if } x \in [\pi, 2\pi]$$

EXTREMA:

$$\text{MAX} = 1$$

$$\text{MAX} = -1$$

$$\text{Amplitude} = \frac{\text{Max} - \text{Min}}{2}$$

$$= \frac{1 - (-1)}{2} \cong \frac{1+1}{2} = \frac{2}{2} = 1$$

Basic Equations

When $\theta \in [0, 2\pi[$, the equation
 $\sin \theta = k$ yields two solutions
 θ_1 and θ_2 .

Ex: if $\sin \theta = \frac{\sqrt{2}}{2}$
 $\theta = \frac{\pi}{4}, \frac{3\pi}{4}$

over all \mathbb{R}

$$\theta = \left[\frac{\pi}{4} + 2\pi n \right] \cup \left[\frac{3\pi}{4} + 2\pi n \right]$$

$n \in \mathbb{Z}$

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Q1

Q2

-love Hassan ♥