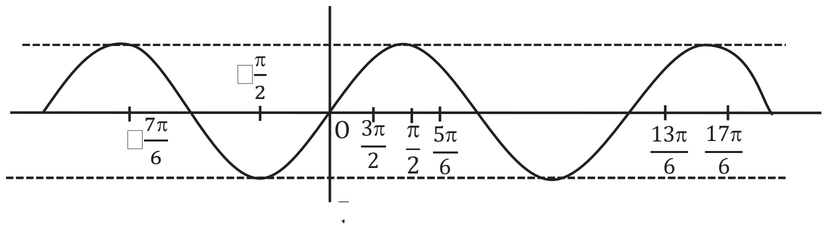
PRINCIPAL VALUE AND GENERAL VALUE

As discussed in the section about Trigonometric Equations, for a specific value of "k," $(-1 \le k \le 1)$ The equation $\sin\theta = k$ can be true for many different values of θ, and there are countless possibilities.The same remark applies to $\cos\theta = k$, $-1 \le k \le 1$ or $\tan\theta = k$, $-\infty < k < \infty$ etc.

For instance, the values of θ, satisfying $\sin\theta = \frac{1}{2}$ are given by

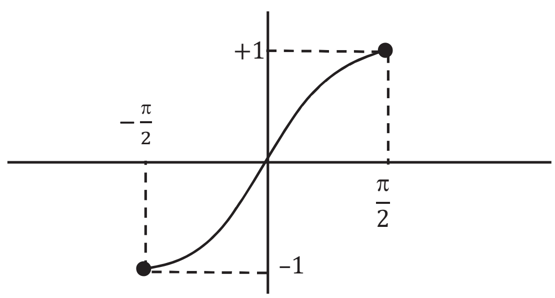
$\ldots, -\frac{11\pi}{6}, -\frac{7\pi}{6}, \frac{\pi}{6}, \frac{5\pi}{6}, \frac{13\pi}{6}, \frac{17\pi}{6}, \ldots$

These are the common or usual values of θ.



It's clear that function f isn't one-to-one or onto, but for it to have an inverse, it must be both one-to-one and onto, known as bijective. Trigonometric functions aren't bijective. However, by limiting the function's domain, we can make it bijective. Now,

there is only one value of x satisfying $\sin x = \frac{1}{2}$ where $x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$. We call this value the main or principal value. Additionally, we can notice that f: $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right] \to [-1,1]$ $f(x) = \sin x$ is one-one onto.



When talking about inverse trigonometric functions, we use two notations – Arc and arc. Arc sin x represents a number whose sine is x, and there are obviously infinite such numbers called general values.

However, arc sin x or $\sin^{-1} x$ represents a number that falls within a specific range or interval $-\frac{\pi}{2}, \frac{\pi}{2}$

i.e., $\sin^{-1}x$ represents an angle and indicates the smallest numerical angle whose sine is x.