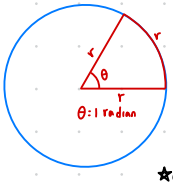


$C = 2\pi r$

2π radians $= 360°$

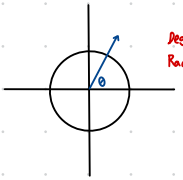
π rad $= 180°$

$\frac{\pi}{2}$ rad $= 90°$

$\frac{\pi}{4}$ rad $= 45°$

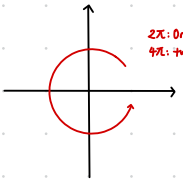
★ Converting Degrees to Radians : $R = \frac{D}{180}\pi$

Converting Radians to Degrees: $D = \frac{R}{\pi} \cdot 180$



Degrees: $\theta = 60°$

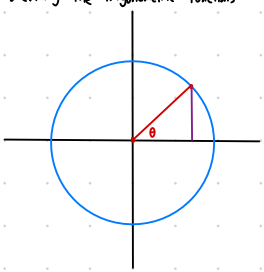
Radians: $\theta = \pi/3$

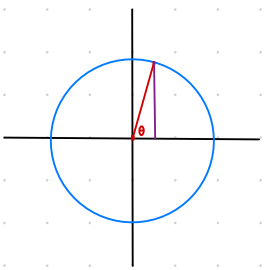


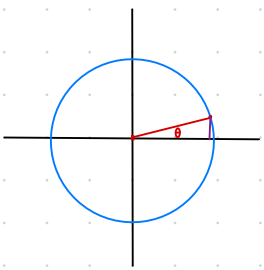
2π: Once around

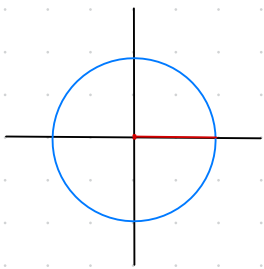
4π: twice around

Deriving the Trigonometric Functions





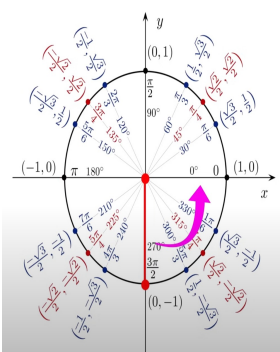


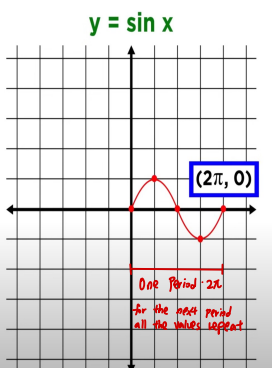


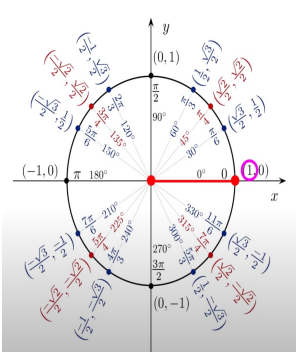
the lengths of the legs always depend on the angle, θ. Therefore, trig functions are periodic. (Period $= 2\pi$)

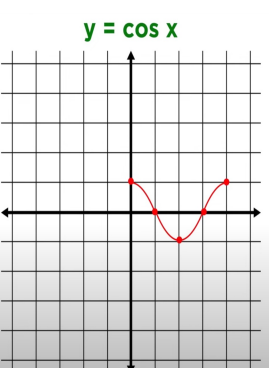
the angle, θ, and the side lengths are related by several trigonometric functions

Opposite ① $\sin\theta = \frac{Opp}{Hyp}$ ② $\cos\theta = \frac{Adj}{Hyp}$ ③ $\tan\theta = \frac{Opp}{Adj}$



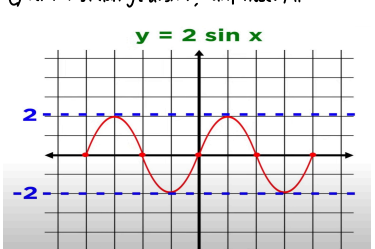


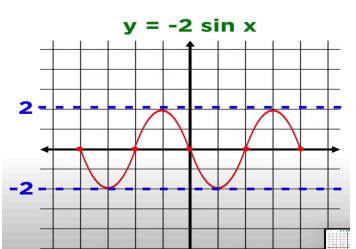




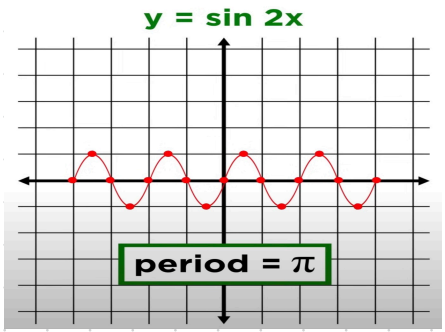
Transformations:

① Vertical stretch: $y = a \cdot \sin x$, amplitude: $|a|$





② horizontal shrink: $y = \sin bx$. period $= 2\pi/b$. i.e., $b = 2$, period $= \pi$



③ Vertical shift: $y = \sin x + k$

④ horizontal shift: $y = \sin(x+b)$. i.e., $y = \sin(x+\frac{\pi}{2}) = \cos x$