Trigonometry Review

ANGLES

Counterclockwise gives a positive angle

Clockwise gives a negative angle

Co-Terminal Angles: two angles that describe the same function; however, one of the angles is measured clockwise and the other is measured counterclockwise.
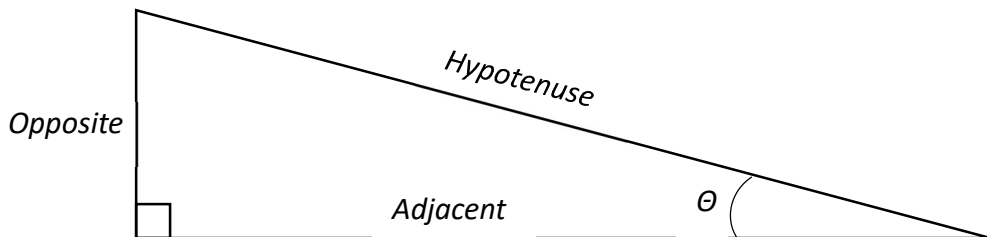
RADIANS VERSUS DEGREES

$2\pi\ radians = 365\ degrees$

Convert Degrees to Radians: Multiply by $\dfrac{\pi}{180}$

Convert Radians to Degrees: Multiply by $\dfrac{180}{\pi}$

TRIG FUNCTIONS

Remember: **SOHCAHTOA!**

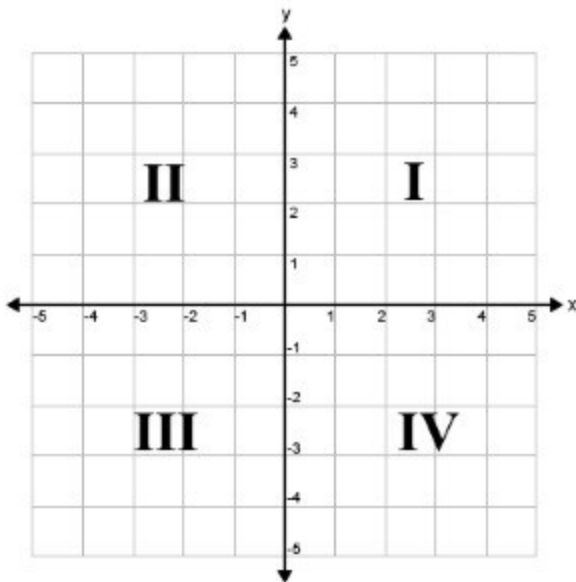$$\sin(\theta) = \frac{Opposite}{Hypotenuse} \qquad \csc(\theta) = Reciprocal\ of\ \sin = \frac{Hypotenuse}{Opposite}$$

$$\cos(\theta) = \frac{Adjacent}{Hypotenuse} \qquad \sec(\theta) = Reciprocal\ of\ \cos = \frac{Hypotenuse}{Adjacent}$$

$$\tan(\theta) = \frac{Opposite}{Adjacent} \qquad \cot(\theta) = Reciprocal\ of\ \tan = \frac{Adjacent}{Opposite}$$

Which value is a positive number?

I: All

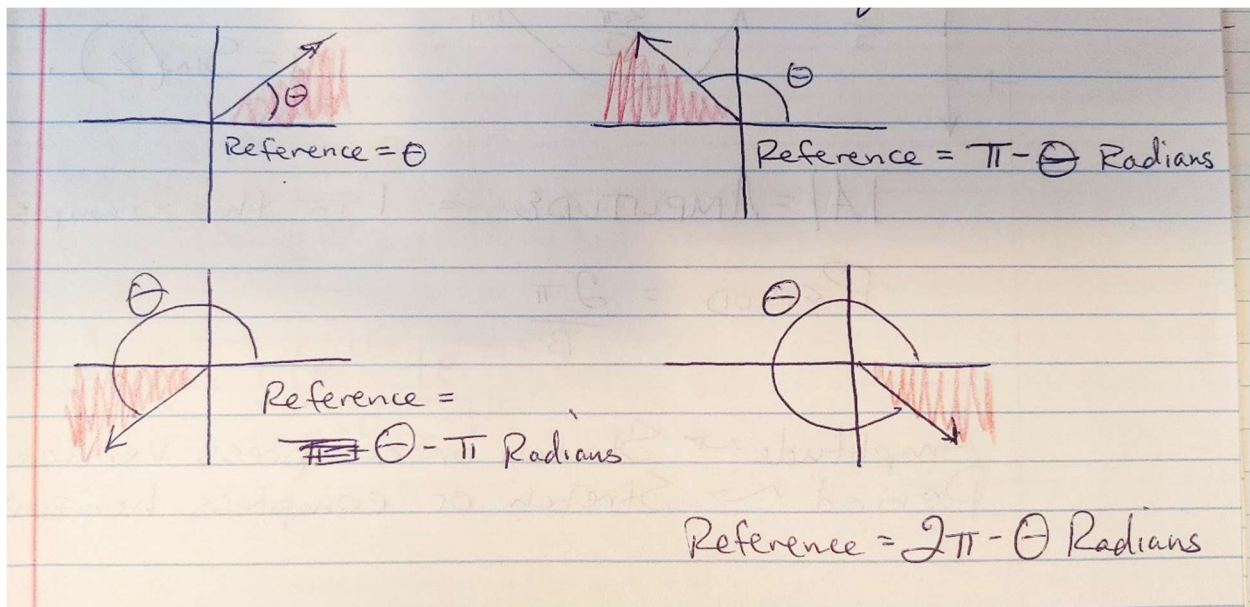**II:** Sine and Cosecant

III: Tangent and Cotangent

IV: Cosine and Secant

Remember: "All Students Take Calculus"

REFERENCE ANGLES

Generate an acute angle on the x-axis and then use ASTC.

Reference = θ

Reference = $\pi - \theta$ Radians

Reference = $\theta - \pi$ Radians

Reference = $2\pi - \theta$ Radians

EXPONENTIAL TRIG FUNCTIONS

$$\sin(\theta) = \frac{e^{i\theta} - e^{-i\theta}}{2i}$$

$$\csc(\theta) = Reciprocal\ of\ \sin = \frac{2i}{e^{i\theta} - e^{i\theta}}$$

$$\cos(\theta) = \frac{e^{i\theta} - e^{-i\theta}}{2}$$

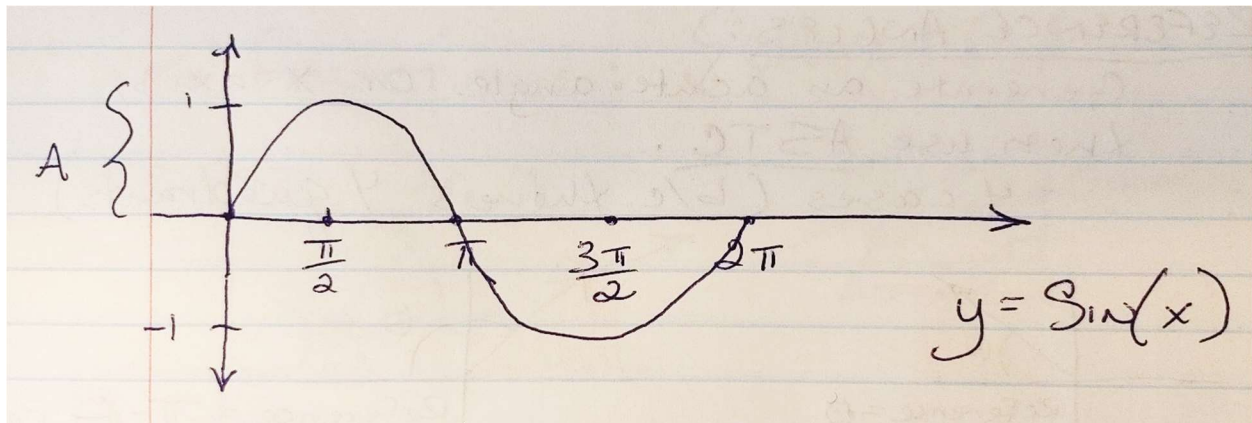$$\sec(\theta) = Reciprocal\ of\ \cos = \frac{2}{e^{i\theta} - e^{i\theta}}$$

$$\tan(\theta) = \frac{e^{i\theta} - e^{-i\theta}}{i(e^{i\theta} + e^{-i\theta})}$$

$$\cot(\theta) = Reciprocal\ of\ \tan = \frac{i(e^{i\theta} + e^{-i\theta})}{e^{i\theta} - e^{-i\theta}}$$

INVERSE TRIG FUNCTIONS

$\sin^{-1}(x) = y$	Returns	$\dfrac{-\pi}{2} \leq y \leq \dfrac{\pi}{2}$
$\cos^{-1}(x) = y$	Returns	$0 \leq y \leq \pi$
$\tan^{-1}(x) = y$	Returns	$\dfrac{-\pi}{2} < y < \dfrac{\pi}{2}$
$\csc^{-1}(x) = y$	Returns	$0 < y < \dfrac{\pi}{2} \ \ OR \dots \ \pi < y \leq \dfrac{3\pi}{2}$
$\sec^{-1}(x) = y$	Returns	$0 < y < \dfrac{\pi}{2} \ \ OR \dots \ \pi \leq y < \dfrac{3\pi}{2}$
$\cot^{-1}(x) = y$	Returns	$0 < y < \pi$

WAVES

$$|A| = Amplitude = 1 \ in \ this \ example$$

$$Period = \frac{2\pi}{3}$$

Amplitude: Stretch or compress a wave function vertically (along the y-axis)

Period: Stretch or compress a wave function horizontally (along the x-axis)

Wavelength: Distance over which a wave's shape repeats. Most people measure peak to peak or trough to trough.

Frequency: Measures the number of cycles of a wave over a specific time or distance