Trigonometry Review

Patrick Chen

Sept 4, 2024

Angles

Positive angles is counter clockwise, negative angles are clockwise. In this course, we will use radians. Radians is a measure of how many times a radius fit in the arc corresponding with the angle.

$$\pi \ radian = 180^\circ$$
$$\frac{\pi D}{180^\circ} = rad$$

Note that $-\frac{5\pi}{4}$ is not the same as $\frac{3\pi}{4}$ even though it ends in the same place because one is clockwise and the other is counter clockwise

Acute angles

Trig functions can be defined with right triangles

$$sin\theta = \frac{opp}{hyp} \quad cos\theta = \frac{adj}{hyp} \quad tan\theta = \frac{opp}{adj}$$
$$csc\theta = \frac{1}{sin\theta} \quad sec\theta = \frac{1}{soc\theta} \quad cot\theta = \frac{1}{tan\theta}$$

Special triangles: $(1, 1, \frac{\sqrt{2}}{2})$, $(1, 2, \sqrt{3})$

Obtuse and Negative angles

A point with distance r away from the origin and angle θ with have an x coordinate of $rcos\theta$ and a y coordinate of $rsin\theta$

$$sin\theta = \frac{y}{r} \quad cos\theta = \frac{x}{r} \quad tan\theta = \frac{y}{x}$$
$$csc\theta = \frac{1}{sin\theta} \quad sec\theta = \frac{1}{soc\theta} \quad cot\theta = \frac{1}{tan\theta}$$

Trig Identities

$$sin^2\theta + cos^2\theta = 1$$
$$1 + tan^2\theta = sec^2\theta$$
$$1 + cot^2\theta = csc^2\theta$$

Sine is the y axis coordinate so a negating the angle will negate the sine of the angle. Cosine is the x axis coordinate which doesn't change when the angle is negated

$$sin(-\theta) = -sin(\theta)$$
$$cos(-\theta) = cos(\theta)$$

Sine and Cosine is a quarter rotation phase shifted

$$cos\theta = sin(\theta + \frac{\pi}{2})$$
$$sin\theta = cos(\theta - \frac{\pi}{2})$$

θ	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$sin\theta$	0	1	0	-1	0
$cos\theta$	1	0	-1	0	1
$tan\theta$	0	ud	0	ud	0