

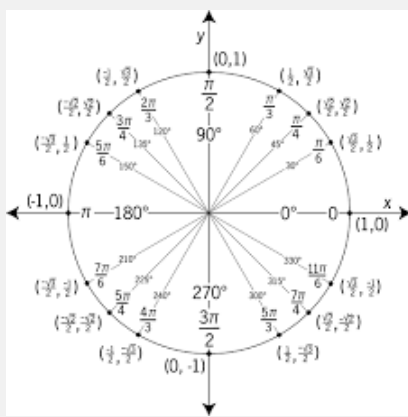
6 Trigonometric Functions

$\sin \angle = o/h$	$\csc \angle = h/o$
$\tan \angle = o/a$	$\cot \angle = a/o$
$\cos \angle = a/h$	$\sec \angle = h/a$

General Definitions of the 6 Trig Functions

$\sin \angle = y/r$	$\csc \angle = r/y$
$\cos \angle = x/r$	$\sec \angle = r/x$
$\tan \angle = y/x$	$\cot \angle = x/y$

Unit Circle



Vocabulary

Initial Side The fixed ray of an angle

Terminal Side The rotated ray of an angle

Standard Position Angle whose vertex is on the origin and initial side lies on the x-axis

Coterminal Two angles that have the same terminal side. Coterminal = angle + / - [multiple of 360]

Radian The measure of an angle in standard position whose terminal side intercepts an arc of length r

Sector A section of a circle bound by two radii

Central Angle The internal angle of a sector

Reference Angle the angle formed by the terminal side of another angle and the x-axis

Arc Length and Area of a Sector

Arc Length

$$s = r\theta$$

Area

$$0.5 \times r^2 \times \theta$$

Degrees to Radians

Degrees to Radians

$$\text{Degree} \times [(\pi \text{ radians})/180]$$

Radians to Degrees

$$\text{Radian} \times [180/(\pi \text{ radians})]$$

Sine Functions

Sketching a Sine Curve Graph

1. Find amplitude and period.
 2. Plot 5 points: Midline points, Beginning, End, Middle, Amplitude points (Max, Min).
 3. Sketch curve.

Example: $y = 2 \sin 2x$
 Amplitude = 2
 Period = $\frac{2\pi}{2} = \pi$

5 points: midline - max - midline - min - midline

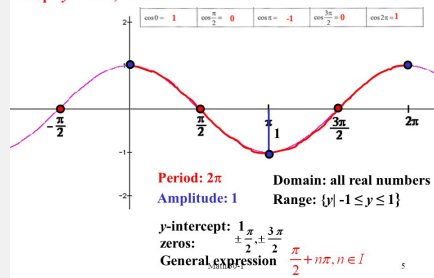
Amplitude = $|a|$

Period = $(2\pi) \div |b|$

Graphing Cosine Functions

Graphing a Periodic Function

Graph $y = \cos x$, radians



Amplitude = $|a|$

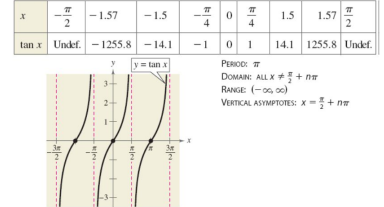
Period = $(2\pi) |b|$

Graphing a Tangent Function

Graph of the Tangent Function

$y = \tan x$

Recall that the tangent function is odd, thus $\tan(-x) = -\tan x$. Therefore, the graph of $y = \tan x$ is symmetric with respect to the origin.



Graphing a Cotangent Function

Graph of the Cotangent Function

To graph $y = \cot x$, use the identity $\cot x = \frac{\cos x}{\sin x}$. At values of x for which $\sin x = 0$, the cotangent function is undefined and its graph has vertical asymptotes.

Properties of $y = \cot x$

- domain: all real x
 $x = n\pi$ ($n \in \mathbb{Z}$)
- range: $(-\infty, +\infty)$
- period: π
- vertical asymptotes:
 $x = n\pi$ ($n \in \mathbb{Z}$)

