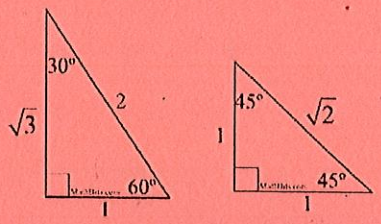
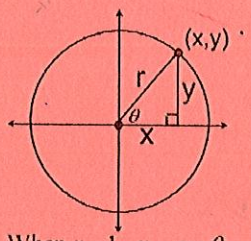
Trigonometric Information for Algebra 2 Common Core

Functions:

- $\sin\theta = \dfrac{\text{opposite}}{\text{hypotenuse}} = \dfrac{y}{r}$
- $\cos\theta = \dfrac{\text{adjacent}}{\text{hypotenuse}} = \dfrac{x}{r}$
- $\tan\theta = \dfrac{\text{opposite}}{\text{adjacent}} = \dfrac{y}{x}$
- $\csc\theta = \dfrac{\text{hypotenuse}}{\text{opposite}} = \dfrac{r}{y}$
- $\sec\theta = \dfrac{\text{hypotenuse}}{\text{adjacent}} = \dfrac{r}{x}$
- $\cot\theta = \dfrac{\text{adjacent}}{\text{opposite}} = \dfrac{x}{y}$





When $r = 1$, $x = \cos\theta$ and $y = \sin\theta$.

θ degrees	θ radians	sin	cos	tan
0°	0	0	1	0
30°	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45°	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60°	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90°	$\frac{\pi}{2}$	1	0	undefined

Degrees and Radians:

- *Convert Degrees to Radians*: multiply by $\dfrac{\pi}{180}$
- *Convert Radians to Degrees*: multiply by $\dfrac{180}{\pi}$

- Radian measure θ of a central angle of a circle is defined as the ratio of the length of the arc the angle subtends, s, divided by the radius of the circle, r. $\theta = \dfrac{s}{r}$ or $s = \theta r$

Ratios:

- $\tan\theta = \dfrac{\sin\theta}{\cos\theta}$
- $\cot\theta = \dfrac{\cos\theta}{\sin\theta}$

Reciprocals:

- $\csc\theta = \dfrac{1}{\sin\theta}$
- $\sec\theta = \dfrac{1}{\cos\theta}$
- $\cot\theta = \dfrac{1}{\tan\theta}$

Odd/Even:

$f(-x) = f(x) \rightarrow$ EVEN
$f(-x) = -f(x) \rightarrow$ ODD

- cosine is even: $\cos(-x) = \cos(x)$
- sine is odd: $\sin(-x) = -\sin(x)$
- tangent is odd: $\tan(-x) = -\tan(x)$

Pythagorean Identities:

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

Angle Sum/Difference Identities:

- $\sin(A+B) = \sin A\cos B + \cos A\sin B$
- $\cos(A+B) = \cos A\cos B - \sin A\sin B$
- $\tan(A+B) = \dfrac{\tan A + \tan B}{1 - \tan A\tan B}$
- $\sin(A-B) = \sin A\cos B - \cos A\sin B$
- $\cos(A-B) = \cos A\cos B + \sin A\sin B$
- $\tan(A-B) = \dfrac{\tan A - \tan B}{1 + \tan A\tan B}$

Double Angles:

- $\sin 2A = 2\sin A\cos A$
- $\cos 2A = \cos^2 A - \sin^2 A$
- $\cos 2A = 2\cos^2 A - 1$
- $\cos 2A = 1 - 2\sin^2 A$
- $\tan 2A = \dfrac{2\tan A}{1 - \tan^2 A}$

Graphing: (sinusoidal)

For $y = A\sin(B(x - C)) + D$

- Amplitude $= |A|$
- Frequency $= B$
- Period $= \dfrac{2\pi}{B}$
- Horizontal Shift $= C$
- Vertical Shift $= D$

Note: C may also be called "phase shift" when $B = 1$.

(cos, sin)

Points of Special Interest on the Unit Circle: