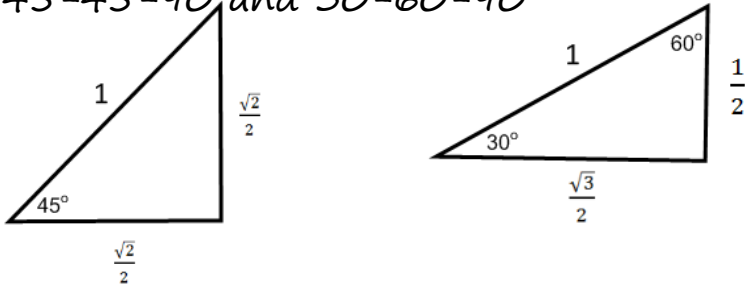


Trig Review

45-45-90 and 30-60-90



Right Triangle Trigonometry:

Trig Ratios SOH-CAH-TOA

$$\tan = \frac{\sin}{\cos}$$

$$\sin = \frac{\text{opposite}}{\text{hypotuse}}$$

$$\cos = \frac{\text{adjacent}}{\text{hypotuse}}$$

$$\tan = \frac{\text{opposite}}{\text{adjacent}}$$

$$\csc = \frac{1}{\sin} = \frac{\text{hypotuse}}{\text{opposite}}$$

$$\sec = \frac{1}{\cos} = \frac{\text{hypotuse}}{\text{adjacent}}$$

$$\cot = \frac{1}{\tan} = \frac{\text{adjacent}}{\text{opposite}}$$

Radians : $180^\circ = \pi$ radians

Conversions: $D = R \cdot \frac{180}{\pi}$ $R = D \cdot \frac{\pi}{180}$

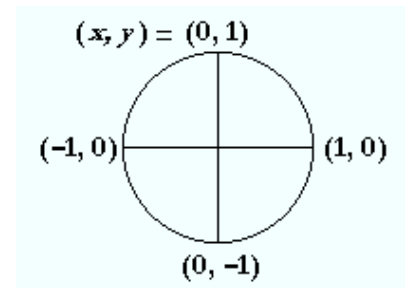
$$\sin 0 = 0 \quad \cos 0 = 1 \quad \tan 0 = 0$$

$$\sin 90 = 1 \quad \cos 90 = 0 \quad \tan 90 = \text{undefined}$$

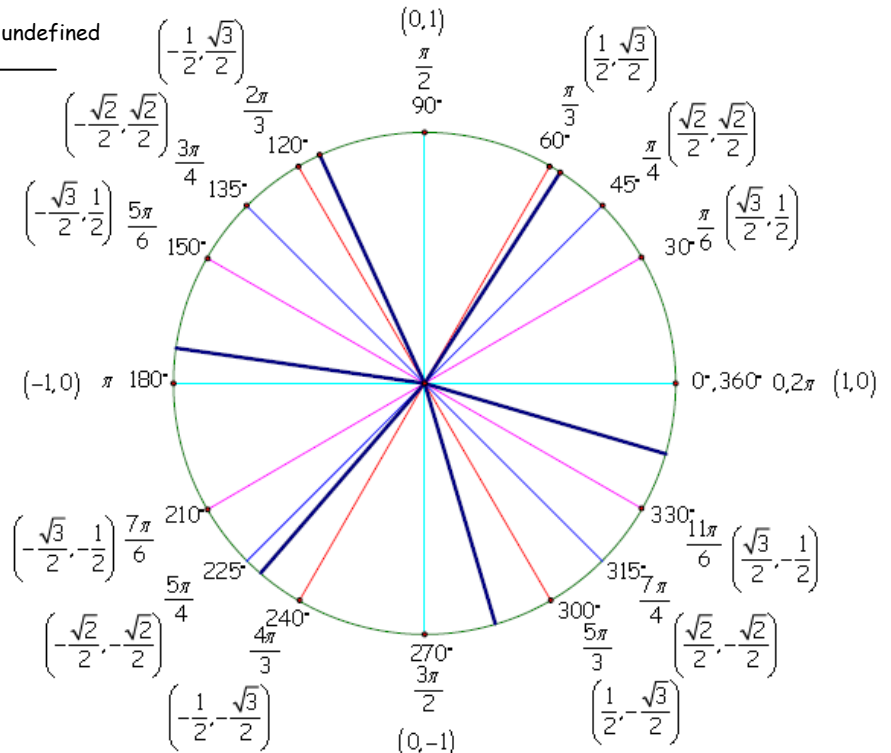
$$\sin 180 = 0 \quad \cos 180 = -1 \quad \tan 180 = 0$$

$$\sin 270 = -1 \quad \cos 270 = 0 \quad \tan 270 = \text{undefined}$$

Quadrantal Angles:
 $\tan = \frac{\sin}{\cos}$

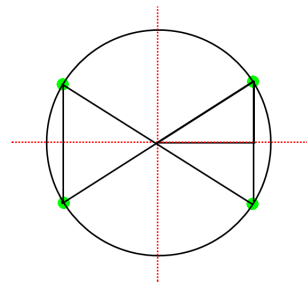


Deg.	Rad.	sin	cos	tan
0	0	0	1	0
30	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90	$\frac{\pi}{2}$	1	0	undefined
180	π	0	-1	0
270	$\frac{3\pi}{2}$	-1	0	undefined



Reference Angles

- Determine in which quadrant the angle θ lies.
- Determine the reference angle θ' .
- Find the indicated ratio for θ' . This must be an exact value.
- Determine the value for the original expression using the ASTC mnemonic.



Example: Find θ if $\sin \theta = -0.78$

Answer: $\sin^{-1}(-0.78) = -51^\circ$

$-51^\circ = 360 - 51 = 309^\circ$.

Sin is also negative in Quadrant III
so the second answer is $180+51 = 231^\circ$

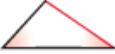




Example: Find θ if $\cos \theta = 0.34$

Answer: $\cos^{-1}(0.34) = 70^\circ$

Cos is also positive in Quadrant IV so the
second answer is $360-70 = 290$

Solving Triangles:

$$\text{Law of Sines: } \frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

If you know this information ...	use this law ...
angle-angle-side 	Law of sines
angle-side-angle 	Law of sines
side-side-angle 	Law of sines
side-angle-side 	Law of cosines
side-side-side 	Law of cosines

Law of Cosines:

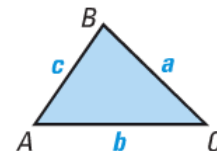
$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

Area of a Triangle

The area of any triangle is given by one half the product of the lengths of two sides times the sine of their included angle. For $\triangle ABC$ shown, there are three ways to calculate the area:



$$\text{Area} = \frac{1}{2}bc \sin A$$

$$\text{Area} = \frac{1}{2}ac \sin B$$

$$\text{Area} = \frac{1}{2}ab \sin C$$

Find all six trig ratios:

$$\sin \theta = \frac{O}{H} = \frac{20}{29} \quad \csc \theta = \frac{1}{\sin} = \frac{H}{O} = \frac{29}{20}$$

$$\cos \theta = \frac{A}{H} = \frac{21}{29} \quad \sec \theta = \frac{1}{\cos} = \frac{H}{A} = \frac{29}{21}$$

$$\tan \theta = \frac{O}{A} = \frac{20}{21} \quad \cot \theta = \frac{1}{\tan} = \frac{A}{O} = \frac{21}{20}$$

