

Lesson 31 Objective: SWBAT find exact values of trig functions.

Kickoff
 If $\sec \theta = \frac{\sqrt{6}}{2}$ and $\sin \theta < 0$ evaluate all six trigonometric functions.

$(\sqrt{6})^2 = a^2 + b^2$
 $6 = 4 + b^2$
 $a = b$
 $b = 2$

$\sin \theta = \frac{-\sqrt{3}}{2}$ $\csc \theta = \frac{2}{-\sqrt{3}}$
 $\cos \theta = \frac{2}{2} = 1$ $\sec \theta = \frac{2}{2} = 1$
 $\tan \theta = \frac{-\sqrt{3}}{2}$ $\cot \theta = \frac{2}{-\sqrt{3}}$

$\textcircled{6}$ $\sin \theta = \frac{-2\sqrt{3}}{13}$ $\csc \theta = \frac{-13}{2\sqrt{3}}$
 $\cos \theta = \frac{2\sqrt{3}}{13}$ $\sec \theta = \frac{13}{2\sqrt{3}}$
 $\tan \theta = \frac{-2}{3}$ $\cot \theta = \frac{3}{2}$

Given: Equilateral $\triangle ABC$, $AB = 1$ and altitude \overline{CD} is drawn to the base \overline{AB} .

$\sin 60 = \frac{\sqrt{3}}{2}$ $\sin 30 = \frac{1}{2}$
 $\cos 60 = \frac{1}{2}$ $\cos 30 = \frac{\sqrt{3}}{2}$
 $\tan 60 = \frac{\sqrt{3}}{1} = \sqrt{3}$ $\tan 30 = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

Given: Isosceles Right $\triangle ABC$, the hypotenuse $AC = 1$.

$a^2 + b^2 = c^2$
 $x^2 + x^2 = 1^2$
 $2x^2 = 1$
 $x^2 = \frac{1}{2}$
 $x = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\sin 45 = \frac{\sqrt{2}}{2}$
 $\cos 45 = \frac{\sqrt{2}}{2}$
 $\tan 45 = 1$

Exact Value Chart:

	$30^\circ (\frac{\pi}{6})$	$45^\circ (\frac{\pi}{4})$	$60^\circ (\frac{\pi}{3})$
$\sin \theta$	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
$\cos \theta$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
$\tan \theta$	$\frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$	1	$\sqrt{3}$

Determining Radian Measures for 30, 45, 60:

Directions: Find the exact value of each.

$\sin 240$ $\cos 300$ $\tan 495$
 $Q = III$ IV $495 - 360 = 135$
 $reb \rightarrow 240 - 180 = 60$ $reb \times 60$ 135
 $\sin 60 = \frac{\sqrt{3}}{2}$ $\sin 135 = \frac{\sqrt{2}}{2}$ $reb \times 45$
 $S: -$ $(-)$
 $\cot \frac{7\pi}{6}$ $\csc \frac{5\pi}{6}$ $\sec -750$
 $reb \times 30$ $reb \times 60$
 $\tan 30 = \frac{\sqrt{3}}{3}$
 $\frac{3}{\sqrt{3}} = \sqrt{3}$

Draw the exact value chart and the unit circle for reference: