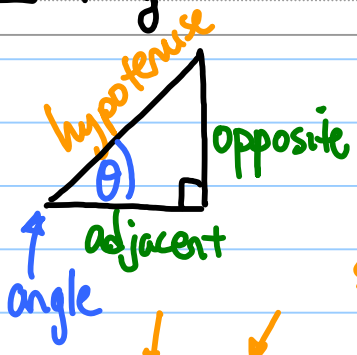
9/6 THU

4.2 Trig Functions: The Unit Circle

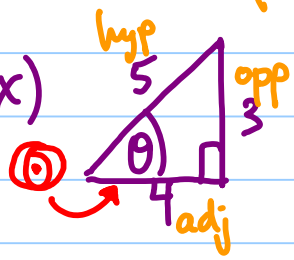


2 sides & 1 angle

SOHCAHTOA → ratios of sides relative to an angle (in a right Δ)

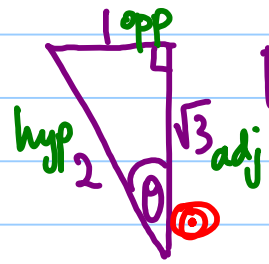
sine cosine tangent

$\sin\theta = \frac{opp}{hyp}$ $\cos\theta = \frac{adj}{hyp}$ $\tan\theta = \frac{opp}{adj}$

ex) 

Find $\sin\theta$, $\cos\theta$, $\tan\theta$. (Find ratios)

$\sin\theta = \frac{opp}{hyp} = \frac{3}{5}$; $\cos\theta = \frac{4}{5}$; $\tan\theta = \frac{3}{4}$

ex) 

Find $\sin\theta$, $\cos\theta$, $\tan\theta$.

$\sin\theta = \frac{1}{2}$; $\cos\theta = \frac{\sqrt{3}}{2}$; $\tan\theta = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

6 Trig Functions → SOHCAHTOA

"diff letters"

$\sin\theta = \frac{O}{H}$ $\cos\theta = \frac{A}{H}$ $\tan\theta = \frac{O}{A}$

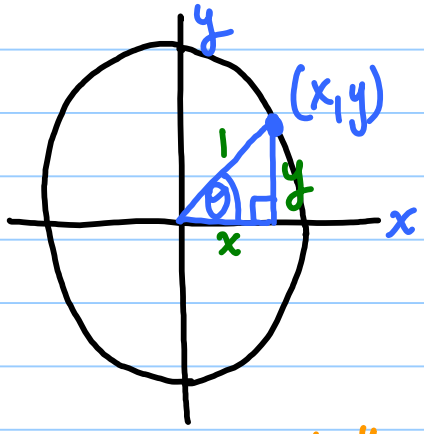
$\csc\theta = \frac{H}{O}$ (Cosecant) $\sec\theta = \frac{H}{A}$ (Secant) $\cot\theta = \frac{A}{O}$ (Cotangent)

} reciprocal

Unit Circle

SOHCAHTOH

$t = \theta$ in the unit circle



radius = 1

$x^2 + y^2 = 1$

$\sin\theta = y$

$\cos\theta = x$

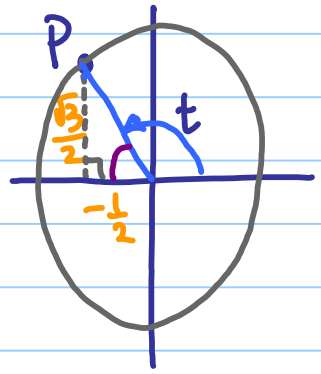
$\tan\theta = \frac{y}{x} \leftrightarrow^{*} \frac{\sin\theta}{\cos\theta}$

$\csc\theta = \frac{1}{y}$

$\sec\theta = \frac{1}{x}$

$\cot\theta = \frac{x}{y}$

ex) $P\left(\overset{x}{-\frac{1}{2}}, \overset{y}{\frac{\sqrt{3}}{2}}\right)$ Find all 6 trig ratios.



$\sin t = \frac{\sqrt{3}}{2}$ ← y value

$\cos t = -\frac{1}{2}$

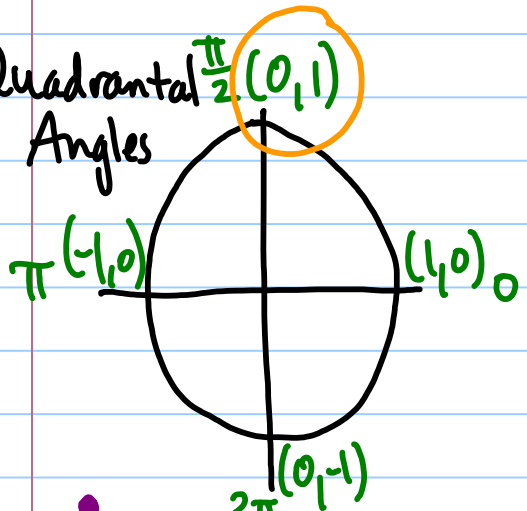
$\tan t = \frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} \rightarrow \frac{\sqrt{3}}{2} \cdot \frac{-2}{1} \rightarrow -\sqrt{3}$

$\csc t = \frac{1}{\frac{\sqrt{3}}{2}} = \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} \rightarrow \frac{2\sqrt{3}}{3}$

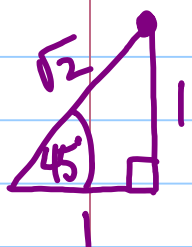
$\sec t = \frac{1}{-\frac{1}{2}} = -2$

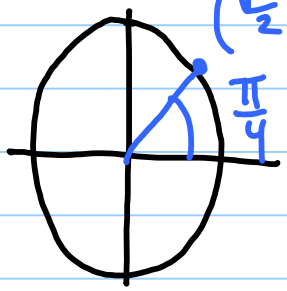
$\cot t = \frac{1}{-\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} \rightarrow -\frac{\sqrt{3}}{3}$

Quadrantal Angles



$0, 2\pi$	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$
$\sin 0 = 0$	$\sin\frac{\pi}{2} = 1$	$\sin\pi = 0$	$\sin\frac{3\pi}{2} = -1$
$\cos 0 = 1$	$\cos\frac{\pi}{2} = 0$	$\cos\pi = -1$	$\cos\frac{3\pi}{2} = 0$
$\tan 0 = \frac{0}{1} = 0$	$\tan\frac{\pi}{2} = \frac{1}{0} =$ undefined	$\tan\pi = 0$	$\tan\frac{3\pi}{2} = \frac{-1}{0} =$ und





$\frac{\pi}{4}$

$\sin\frac{\pi}{4} = \frac{\sqrt{2}}{2}$

$\cos\frac{\pi}{4} = \frac{\sqrt{2}}{2}$

$\tan\frac{\pi}{4} = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = 1$

18 flash cards: $\sin, \cos, \tan \rightarrow 0, \frac{\pi}{4}, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$

p486, #1-12