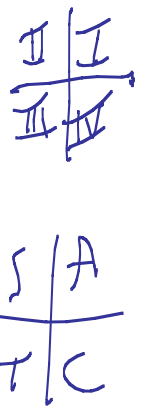


	$\pi/6$	$\pi/4$	$\pi/3$
sin	$1/2$	$\sqrt{2}/2$	$\sqrt{3}/2$
cos	$\sqrt{3}/2$	$\sqrt{2}/2$	$1/2$
tan	$1/\sqrt{3}$	1	$\sqrt{3}$

**PreCalculus Class Notes TE14 Solving Trig Equations with  $b = 1$**

**Finding all solutions in one period**

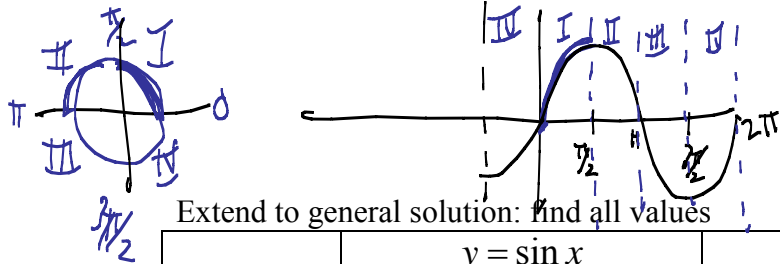
Recall information about period and signs in quadrants



$y = \sin x$		$y = \cos x$		$y = \tan x$	
Period = $2\pi$ Solve in $[0, 2\pi)$		Period = $2\pi$ Solve in $[0, 2\pi)$		Period = $\pi$ Solve for $(-\frac{\pi}{2}, \frac{\pi}{2})$	
+	+	-	+	<del>-</del>	+
-	-	-	+	<del>+</del>	-

Solve for all solutions in one period

<p><math>\sin \theta = \frac{\sqrt{2}}{2}</math> ref <math>\angle = \frac{\pi}{4}</math></p> <p><math>\frac{5\pi}{4}, \frac{-\pi}{4}</math></p>	<p><math>\sin \theta = -1</math></p> <p><math>\frac{-\pi}{2}</math></p>
<p><math>\cos \theta = \frac{1}{2}</math> ref <math>\angle = \frac{\pi}{3}</math></p> <p><math>\frac{2\pi}{3}, \frac{4\pi}{3}</math></p>	<p><math>\cos \theta = 2</math></p> <p>DNE</p> <p>NO SOLUTION</p>
<p><math>\tan \theta = 1</math> ref <math>\angle = \frac{\pi}{4}</math></p> <p><math>\frac{\pi}{4}, \frac{5\pi}{4}</math></p>	<p><math>\tan \theta = -\frac{\sqrt{3}}{3}</math> ref <math>\angle = \frac{\pi}{6}</math></p> <p><math>-\frac{\pi}{6}, \frac{5\pi}{6}</math></p>



Extend to general solution: find all values

*n is an integer*

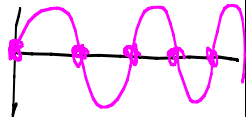
	$y = \sin x$	$y = \cos x$	$y = \tan x$
Graph			
Equation	$\sin \theta = -\frac{\sqrt{2}}{2}$	$\cos \theta = -\frac{1}{2}$	$\tan \theta = 1$
Soln in one period	$-\frac{\pi}{4}, \frac{5\pi}{4}$	$\frac{2\pi}{3}, \frac{4\pi}{3}$	$\frac{\pi}{4}$
General (all) soln	$\frac{\pi}{4} + 2\pi n, \frac{5\pi}{4} + 2\pi n$	$\frac{2\pi}{3} + 2\pi n, \frac{4\pi}{3} + 2\pi n$	$\frac{\pi}{4} + \pi n$

*period*

For the general solution, *add* multiples of the period to each solution: solutions + period · *n*, where *n* is an integer

Find all solutions to the equation.

$\sin x = \frac{\sqrt{3}}{2}$  $\text{ref } \theta = \frac{\pi}{3}$ $-\frac{\pi}{3} + 2\pi n$ $\frac{4\pi}{3} + 2\pi n$	$\sec t = -1$ $\cos t = -1$  $\pi + 2\pi n$	$\cot \theta = \frac{\sqrt{3}}{3}$ $\tan \theta = \frac{3\sqrt{3}}{\sqrt{3}\sqrt{3}} = \frac{3\sqrt{3}}{3} = \sqrt{3}$ $\frac{\pi}{3} + \pi n$
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$2\cos\theta + 2 = 3$ $2\cos\theta = 1$ $\cos\theta = \frac{1}{2}$ <p> <del> <math>\frac{\pi}{3}</math>  <math>\frac{2\pi}{3} + 2\pi n</math>  <math>-\frac{\pi}{3} + 2\pi n</math> </del> </p>	$\sin\theta \cos\theta = 0$ $\sin\theta = 0 \quad \cos\theta = 0$ <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <math>0 + 2\pi n</math>  <math>\pi + 2\pi n</math> </div> <p>or</p> $\frac{\pi}{2} + 2\pi n$ $-\frac{\pi}{2} + 2\pi n$ 	$\sqrt{3}\tan x + 5 = 4$ $\sqrt{3}\tan x = -1$ $\tan x = \frac{-1}{\sqrt{3}}$ <p> <del> <math>\frac{\pi}{6}</math>  <math>-\frac{\pi}{6} + \pi n</math> </del> </p>
$3\sec x - 7 = -1$ $3\sec x = 6$ $\sec x = 2$ $\cos x = \frac{1}{2}$ <p> <math>\frac{\pi}{3} + 2\pi n</math>  <math>-\frac{\pi}{3} + 2\pi n</math> </p>	$-2\csc x + 5 = 9$ $-2\csc x = 4$ $\csc x = -2$ $\sin x = -\frac{1}{2}$ <p> <del> <math>\frac{\pi}{6}</math>  <math>\frac{7\pi}{6} + 2\pi n</math> </del> </p>	$5\cot x + 5 = 0$ $5\cot x = -5$ $\cot x = -1$ $\tan x = -1$ $x = -\frac{\pi}{4} + \pi n$