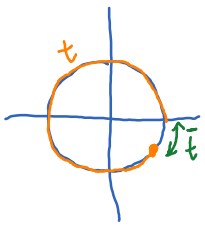
Lecture 2

Thursday, May 2, 2024 10:53 PM

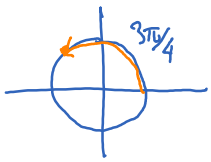
Reference number associated with t is the shortest distance (along the unit circle) to the x-axis.



$$\bar{t} = \left| \text{round}\left(\frac{t}{\pi}\right) - \frac{t}{\pi} \right| \pi$$

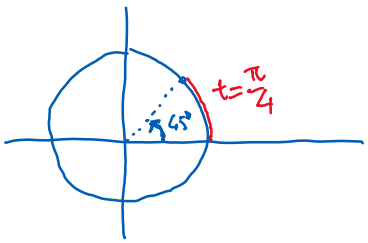
Note: $\bar{t}$ is always been 0 and $\frac{\pi}{2}$.

Ex $t = \frac{3\pi}{4}$



$$\bar{t} = \left| 1 - \frac{3}{4} \right| \pi = \frac{\pi}{4}$$

Convert the number to degree (more details in Section 6.1)



The full revolution is 360°. ($t = 2\pi$)

Half a revolution is 180°. ($t = \pi$)

A quarter revolution is 90°. ($t = \frac{\pi}{2}$)

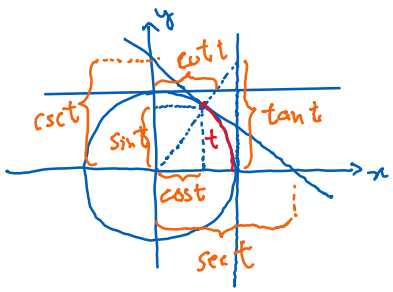
A third revolution is 120° ($t = \frac{2\pi}{3}$)

. . . .

One of the reasons why the angle of the full revolution is 360° is because it is easy to divide.

Trigonometric functions

They are functions on the unit circle.



The terminal point (x, y) associated with the number t is also associated with 6 following quantities:

$\sin t = y$ $\qquad$ $\sec t = \frac{1}{x}$

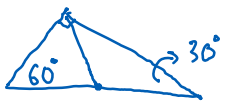
$\cos t = x$ $\qquad$ $\csc t = \frac{1}{y}$

$\tan t = \frac{y}{x}$

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

Practice with the following terminal points: $t = 0, \frac{\pi}{2}, \pi, 2\pi, \frac{\pi}{4}, \frac{9\pi}{4}$

Practice with $t = \frac{\pi}{6}, \frac{\pi}{3}, \frac{2\pi}{3}$



t	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{2\pi}{3}$
sin			
cos			
tan			
cot			
sec			
csc			

- Domain of trigonometric functions

$\sin t$	all
$\cos t$	all
$\tan t$	all but $t = \frac{\pi}{2} + k\pi$ $(k \in \mathbb{Z})$
$\cot t$	all but $t = k\pi$ $(k \in \mathbb{Z})$
$\sec t$	all but $t = \frac{\pi}{2} + k\pi$ $(k \in \mathbb{Z})$
$\csc t$	all but $t = k\pi$ $(k \in \mathbb{Z})$