Lecture 5

Saturday, May 11, 2024 2:12 PM

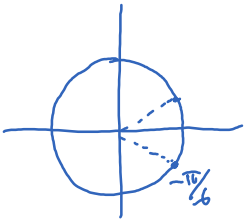
Remark: $(\sin t)^2$ is usually written as $\sin^2 t$ or $\sin^2(t)$.

Remark:

$$\tan\left(\frac{35\pi}{6}\right) = ?$$

$$\frac{35\pi}{6} = \frac{36-1}{6}\pi = \left(6 - \frac{1}{6}\right)\pi = \underbrace{6\pi - \frac{\pi}{6}}$$

the same terminal point as $-\frac{\pi}{6}$



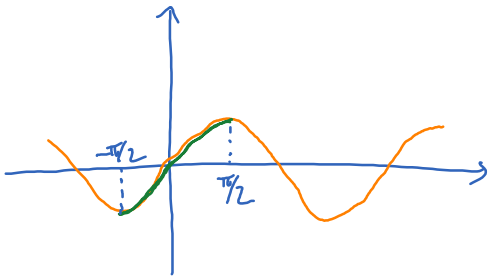
$$\tan\left(\frac{35\pi}{6}\right) = \tan\left(-\frac{\pi}{6}\right) = \frac{\sin(-\pi/6)}{\cos(-\pi/6)}$$

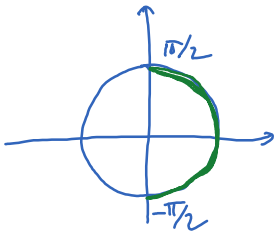
$$= \frac{-\sin(\pi/6)}{\cos(\pi/6)} = \frac{-1/2}{\sqrt{3}/2} = -\frac{1}{\sqrt{3}}$$

More exercises using the periodicity, even-odd properties of sin, cos, tan, ...

$$\tan\left(\frac{29\pi}{4}\right), \quad \sec\left(\frac{26\pi}{3}\right)$$

Inverse trigonometric functions





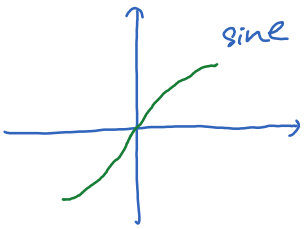
$\sin^{-1} x$, or $\arcsin x$ is a number in $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ whose sine is equal to x.

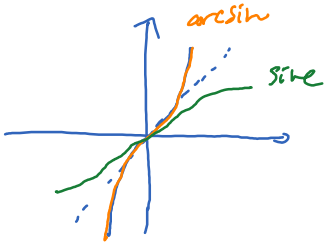
Ex What is $\arcsin\left(\frac{1}{2}\right)$?

How about $\arcsin\left(-\frac{1}{2}\right)$, $\arcsin\left(-\frac{1}{\sqrt{2}}\right)$, $\arcsin(0)$, $\arcsin(1)$?

Ex Compute $\arcsin\left(\sin\left(\frac{13\pi}{2}\right)\right)$, $\arcsin\left(\sin\left(\frac{17\pi}{3}\right)\right)$.

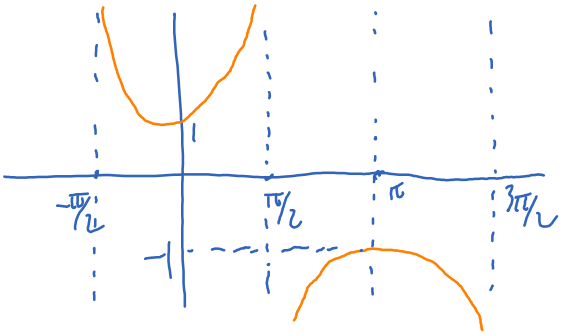
Ex Find arcsin on a calculator.





Summary:

	Domain	range
arcsin	$[-1,1]$	$[-\frac{\pi}{2}, \frac{\pi}{2}]$
arccos	$[-1,1]$	$[0,\pi]$
arctan	$\mathbb{R}$	$(-\frac{\pi}{2}, \frac{\pi}{2})$
arccot	$\mathbb{R}$	$(0,\pi)$
arcsec	$(-\infty,-1]\cup[1,\infty)$	$[0,\frac{\pi}{2})\cup(\frac{\pi}{2},\pi]$
arccsc	$(-\infty,-1]\cup[1,\infty)$	$[-\frac{\pi}{2},0)\cup(0,\frac{\pi}{2}]$



Ex Find $\sin(\arctan(-1))$.

* Angle measure