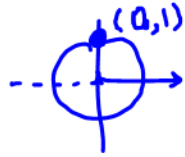
The function $\tan(\theta)$



We define $\tan(\theta) = \dfrac{\sin(\theta)}{\cos(\theta)}$

	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\sin(\theta)$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos(\theta)$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
$\tan(\theta)$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	DNF

$\tan(\pi/6) = \dfrac{1/2}{\sqrt{3}/2} \cdot \dfrac{2}{2} = \dfrac{1}{\sqrt{3}}$

$\tan(\pi/3) = \dfrac{\sqrt{3}/2}{1/2} = \sqrt{3}$

$\tan(0) = \dfrac{0}{1} = 0$

$\tan(\pi/2) = \dfrac{1}{0}$ DNE

It is very important to know *both* the definition *and* to memorize this table.

± magnitude

E.g. Compute $\tan\left(\frac{7\pi}{4}\right) =$ **− 1**

$7 \cdot \frac{\pi}{4}$

2 options for magnitude
use table or compute sin & cos and divide

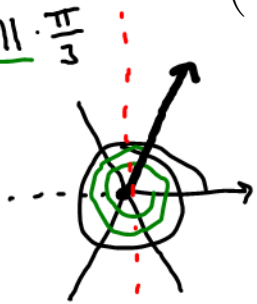
interior $\measuredangle = \pi/4$

$\tan(\pi/4) = 1$

$\tan = \frac{\sin}{\cos} = \frac{(-)}{(+)} = (-)$

E.g. Compute $\tan\left(\frac{-11\pi}{3}\right) =$ $+\sqrt{3}$

$-11 \cdot \frac{\pi}{3}$



$\tan = \frac{\sin}{\cos} = \frac{(+)}{(+)} = (+)$

reference $\measuredangle = \pi/3$

$\tan(\pi/3) = \sqrt{3}$

OR compute

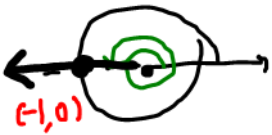
$\tan(\pi/3) = \frac{\sin(\pi/3)}{\cos(\pi/3)}$

$= \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$

$$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$$

E.g. Compute $\tan(3\pi)$ $= 0$

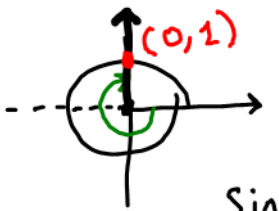
$3 \cdot \pi$



$$\left.\begin{aligned} \sin(3\pi) &= 0 \\ \cos(3\pi) &= -1 \end{aligned}\right\} \Rightarrow \tan(3\pi) = \frac{0}{-1} = 0$$

E.g. Compute $\tan\left(\frac{-3\pi}{2}\right)$ * DNE.

$-3 \cdot \frac{\pi}{2}$



$\sin\left(\frac{-3\pi}{2}\right) = 1$

$\cos\left(\frac{-3\pi}{2}\right) = 0$

$\tan\left(\frac{-3\pi}{2}\right) = \frac{1}{0}$ DNE