

Section 4.3 B: Using Reference Angles

- 1) Find the reference angle θ'
- 2) Find the trig value of θ'
- 3) Use the Quadrant of θ to determine the sign of the trig value
 \oplus/\ominus

a) $\cos -120^\circ$

$\theta' = 60^\circ$ $\theta = -120^\circ$

$= -\cos 60^\circ = -\frac{1}{2}$

b) $\tan \frac{7\pi}{4}$

$= -\tan \frac{\pi}{4} = -1$

c) $\sin 510^\circ$

$\theta = 30^\circ$

$= +\sin 30^\circ = \frac{1}{2}$

d) $\csc \frac{13\pi}{4}$

$\theta' = \frac{\pi}{4}$

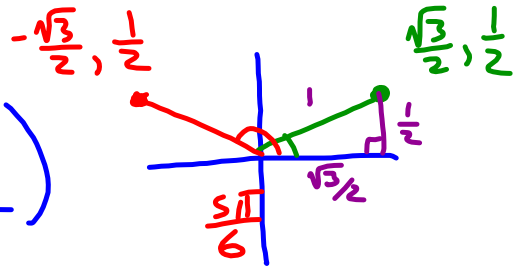
$= -\csc \frac{\pi}{4} = -\sqrt{2} \leftarrow -\frac{1}{\sin \frac{\pi}{4}}$

Wrapping Function

Each angle t \leftarrow t is a real number corresponds to a point

$P \mid P(\cos t, \sin t)$

$t = \frac{\pi}{6} \Rightarrow P\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

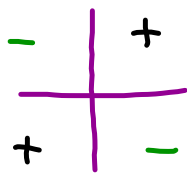


- trig values are repeated every quadrant $2\oplus$ and $2\ominus$

$\sin t = \sin(t + 2n\pi) \quad -\infty < t < \infty \quad \text{Domain:} \quad \text{Range:} \quad -1 < x < 1$

$\cos t = \cos(t + 2n\pi) \quad -\infty < t < \infty \quad -1 < x < 1$

$\tan t = \tan(t + n\pi) \quad -\infty < t < \infty \quad -\infty < x < \infty$



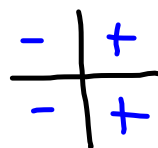
\sin/\cos period = 2π

\tan period = π

Even: Symmetric y-axis

$\cos(2\theta) = \cos(-2\theta)$

$\cos(\theta) = \cos(-\theta)$



\cos

Odd: \sin/\tan are odd

$\sin 2\theta = -\sin(-2\theta)$

$\sin \theta = -\sin(-\theta)$

$\tan 2\theta = -\tan(-2\theta)$

$\tan \theta = -\tan(-\theta)$