

Inverse Trig Functions

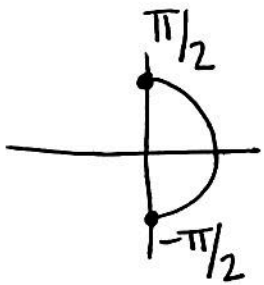
Purpose - Find the ANGLE given the EXACT TRIG VALUE.

In order to find the inverse, we must RESTRICT the angles in order for the original trig function graph ~~will~~ ^{to} pass the horizontal line test.

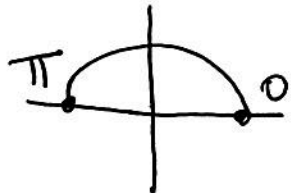
The restricted domains are:

$\arcsin(x)$
or
 $\sin^{-1}(x)$

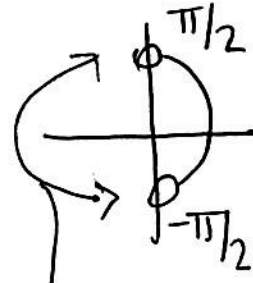
} both mean inverse



$\arccos(x)$
or
 $\cos^{-1}(x)$



$\arctan(x)$
or
 $\tan^{-1}(x)$

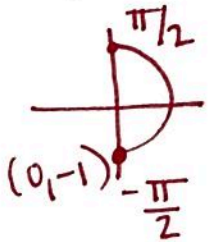


open circles due to vertical asymptotes

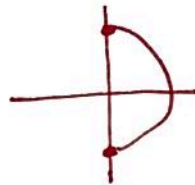
Trick - Use Left Hand
Trick Backwards!

Find the angle using the restricted domain.

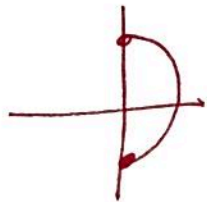
$$\textcircled{1} \arcsin(-1) = \boxed{-\frac{\pi}{2}}$$



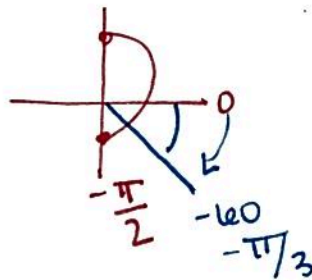
$$\textcircled{2} \sin^{-1}\left(\frac{1}{2}\right) = 30^\circ \rightarrow \boxed{\frac{\pi}{6}}$$



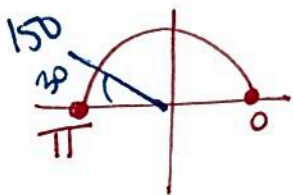
$$\textcircled{3} \sin^{-1}\left(\frac{\sqrt{2}}{2}\right) = 45^\circ \rightarrow \boxed{\frac{\pi}{4}}$$



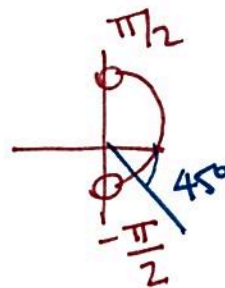
$$\textcircled{4} \arcsin\left(-\frac{\sqrt{3}}{2}\right) = \boxed{-\frac{\pi}{3}}$$



$$\textcircled{5} \arccos\left(-\frac{\sqrt{3}}{2}\right) = 150^\circ \rightarrow \boxed{\frac{5\pi}{6}}$$



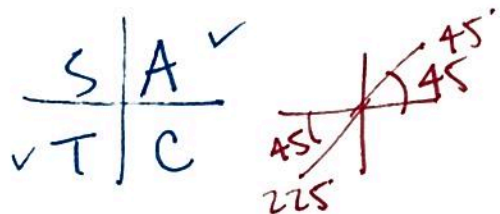
$$\textcircled{6} \tan^{-1}(-1) = \boxed{-\frac{\pi}{4}}$$



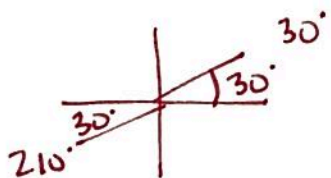
S	A
T	C

Find all the angles in radians from $[0, 2\pi)$
 entire circle!

⑦ $\tan(x) = 1 = \boxed{\frac{\pi}{4}, \frac{5\pi}{4}}$
 $X = \tan^{-1}(1)$

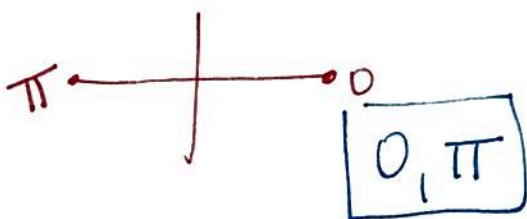


⑧ $\tan(x) = \frac{\sqrt{3}}{3}$
 $X = \tan^{-1}\left(\frac{\sqrt{3}}{3}\right) \rightarrow \frac{1}{\sqrt{3}}$



$\boxed{\frac{\pi}{6}, \frac{7\pi}{6}}$

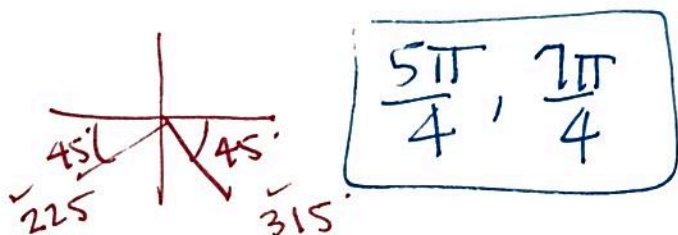
⑨ $\tan(x) = 0 \quad \frac{y}{x} = \frac{0}{\#}$



⑩ $\cos(x) = -1$
 $X = \cos^{-1}(-1)$



⑪ $\sin(x) = -\frac{\sqrt{2}}{2}$
 $X = \sin^{-1}\left(-\frac{\sqrt{2}}{2}\right)$



⑫ $\cos(x) = 0$
 $X = \cos^{-1}(0)$

