

Quiz 5

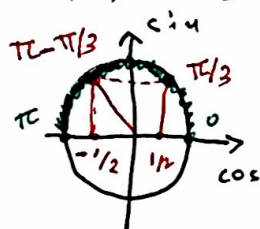
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Name: KEY

1. Find the following angles:

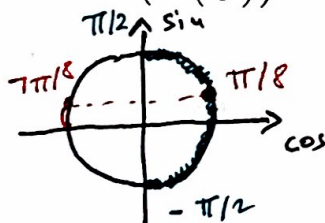
(a) $\cos^{-1}\left(-\frac{1}{2}\right) = \frac{2\pi}{3}$



We know $\cos^{-1}(1/2) = \frac{\pi}{3}$

Thus $\cos^{-1}(-1/2) = \pi - \pi/3 = \boxed{\frac{2\pi}{3}}$

(b) $\sin^{-1}\left(\sin\left(\frac{7\pi}{8}\right)\right) = \frac{\pi}{8}$



Since $\frac{7\pi}{8} = \pi - \frac{\pi}{8}$ we have

$\sin\left(\frac{7\pi}{8}\right) = \sin\left(\frac{\pi}{8}\right)$. Since $\pi/8$

is in range of $\sin^{-1}$ we have

that $\sin^{-1}\left(\sin\frac{7\pi}{8}\right) = \boxed{\frac{\pi}{8}}$

2. Find $\tan\left(\sin^{-1}\left(-\frac{1}{5}\right)\right) = -\frac{\sqrt{6}}{24}$

Let $\theta = \sin^{-1}(-1/5)$. Then θ is in IV

so $\cos\theta > 0$ and $\tan\theta < 0$



$\sin\theta = \frac{1}{5}$

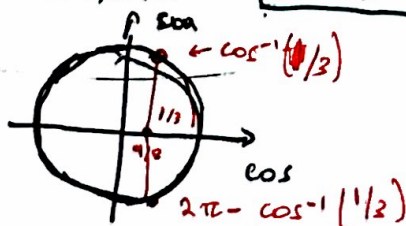
$\tan\theta = \frac{1}{4\sqrt{6}} = \frac{\sqrt{6}}{24}$

$\tan\theta = -\frac{\sqrt{6}}{24}$

$x = 4\sqrt{6}$ $x^2 + 1^2 = 5^2 \Rightarrow x^2 = 24 \Rightarrow x = \sqrt{24} = 4\sqrt{6}$

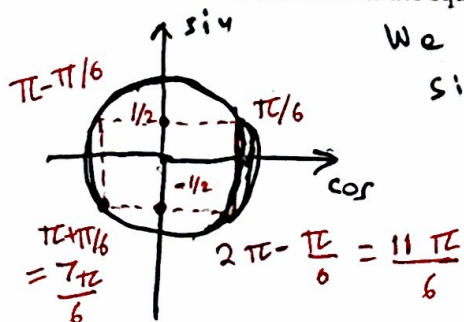
3. Find all solutions of the equation $\cos x = \frac{1}{3}$, in the interval $[0, 2\pi)$.

Two solutions in $[0, 2\pi)$: $\boxed{x = \cos^{-1}(1/3), x = 2\pi - \cos^{-1}(1/3)}$



4. Find all real solutions of the equation $\sin x = -\frac{1}{2}$.

We know $\sin^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{6}$



$x = \frac{11\pi}{6} + 2k\pi, k=0, \pm 1, \pm 2, \dots$

OR

$x = \frac{7\pi}{6} + 2k\pi, k=0, \pm 1, \pm 2, \dots$