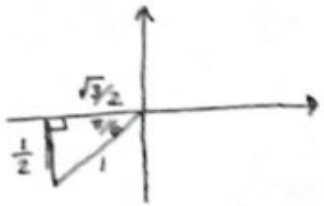
1. Find $\sin^{-1}\left(\sin\left(\frac{7\pi}{6}\right)\right)$.

Since $\frac{7\pi}{6}$ is in the 3rd quadrant:



$\sin\left(\frac{7\pi}{6}\right) = \frac{-1}{2}$.

$\sin^{-1}\left(\frac{-1}{2}\right) =$ Angle θ in $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$ that yields $\frac{-1}{2}$ when we apply sin

$= \frac{-\pi}{6}$

2. When does $\sin(2\cos^{-1}(7x))$ make sense?

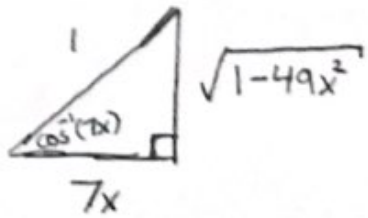
Since the domain of sin is $(-\infty, \infty)$, this makes sense when $\cos^{-1}(7x)$ makes sense. Since the domain of $\cos^{-1}$ is $[-1, 1]$, this makes sense when $-1 \leq 7x \leq 1$ or $\frac{-1}{7} \leq x \leq \frac{1}{7}$.

The positive x values are $(0, \frac{1}{7}]$

Rewrite $\sin(2\cos^{-1}(7x))$:

$\sin(2\cos^{-1}(7x)) = 2\sin(\cos^{-1}(7x))\cos(\cos^{-1}(7x))$

$= 14x \sin(\cos^{-1}(7x))$



$= 14x\sqrt{1-49x^2}$