

Composite Trig Functions

$\sin^{-1}(\sin x) = x$ Domain: $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$
or equivalent x that is in the domain

$\sin(\sin^{-1} x) = x$ Domain: $-1 \leq x \leq 1$
Must be in domain (No equivalent)

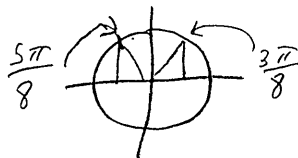
$\cos^{-1}(\cos x) = x$ D: $0 \leq x \leq \pi$
or equivalent x

$\cos(\cos^{-1} x) = x$ D: $-1 \leq x \leq 1$
Must be in domain

$\tan^{-1}(\tan x) = x$ D: $-\frac{\pi}{2} < x < \frac{\pi}{2}$
or equivalent x

$\tan(\tan^{-1} x) = x$ D: $-\infty < x < \infty$

Example: $\sin^{-1}(\sin \frac{5\pi}{8}) = \frac{5\pi}{8}$ ← not in domain



$\frac{3\pi}{8}$ ← equivalent x that is in the domain

Answer: $\boxed{\frac{3\pi}{8}}$

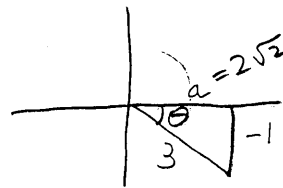
Example: $\sin(\sin^{-1} \frac{5\pi}{8}) = \frac{5\pi}{8}$ ← not in domain

So $\boxed{\text{Not Defined}}$

Example: $\cos[\sin^{-1}(-\frac{1}{3})]$

$\theta = \sin^{-1}(-\frac{1}{3})$

$\sin \theta = -\frac{1}{3} = \frac{\text{opposite}}{\text{hypot.}}$



Then $\cos \theta = \frac{2\sqrt{2}}{3}$ $\boxed{\text{Answer: } \frac{2\sqrt{2}}{3}}$

$a^2 + b^2 = c^2$
 $a^2 + 1^2 = 3^2$
 $a^2 + 1 = 9$
 $a^2 = 8$
 $a = 2\sqrt{2}$