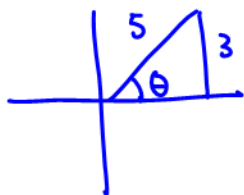


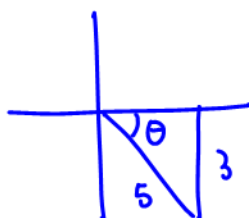
Inverse Trigonometric Functions

1. Draw and label diagrams showing the following angles:

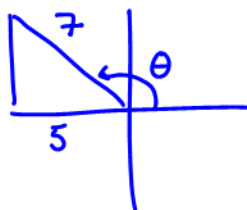
a) $\sin^{-1}\left(\frac{3}{5}\right)$



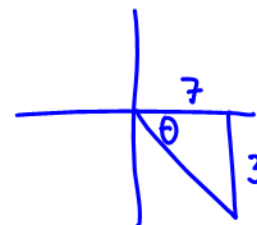
b) $\sin^{-1}\left(-\frac{3}{5}\right)$



c) $\cos^{-1}\left(-\frac{5}{7}\right)$

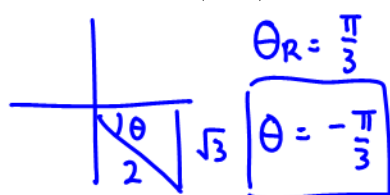


d) $\tan^{-1}\left(-\frac{3}{7}\right)$



2. Determine the following:

a) $\theta = \sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$



$\theta_R = \frac{\pi}{3}$
 $\theta = -\frac{\pi}{3}$

b) $\theta = \arctan(-1)$



$\theta_R = 45^\circ = \frac{\pi}{4}$

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

c) $\sec^{-1}(-2)$

$\theta = \cos^{-1}\left(-\frac{1}{2}\right)$

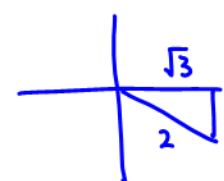


$\theta_R = 60^\circ = \frac{\pi}{3}$

$\theta = \frac{2\pi}{3}$

d) $\text{arccot}(-\sqrt{3})$

$\theta = \tan^{-1}\left(-\frac{1}{\sqrt{3}}\right)$

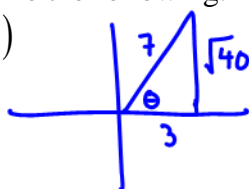


$\theta_R = 30^\circ = \frac{\pi}{6}$

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

3. Determine the following:

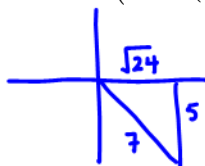
a) $\sin\left(\cos^{-1}\frac{3}{7}\right)$



$\sin\left(\cos^{-1}\frac{3}{7}\right) = +\frac{\sqrt{40}}{7}$

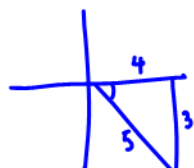
b) $\tan\left(\sin^{-1}\left(-\frac{5}{7}\right)\right)$

$-\frac{5}{\sqrt{24}}$



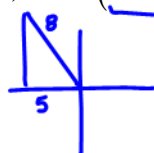
c) $\cos\left(\sin^{-1}\left(-\frac{3}{5}\right)\right)$

$+\frac{4}{5}$



d) $\cos\left(\cos^{-1}\left(-\frac{5}{8}\right)\right)$

$-\frac{5}{8}$



e) $\tan(\sin^{-1} x)$

$a^2 + x^2 = 1^2$
 $a^2 = 1 - x^2$
 $a = \sqrt{1 - x^2}$

$\tan(\sin^{-1} x) = \frac{x}{\sqrt{1-x^2}}$

g) $\cos(\sin^{-1} x)$
 uses same diagram as "e"
 $\cos(\sin^{-1} x) = \frac{\sqrt{1-x^2}}{1}$ or $\sqrt{1-x^2}$

f) $\sin(\sin^{-1} x)$
 uses same diagram as "e"

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

g) $\csc(\cos^{-1} x)$

$\csc \theta = \frac{1}{\sin \theta}$
 $\csc(\cos^{-1} x) = \frac{1}{\sqrt{1-x^2}}$

4. Evaluate the following:

a) $\sin^{-1}(\sin \frac{2\pi}{3})$

$\sin \frac{2\pi}{3} = \frac{\sqrt{3}}{2}$

$\sin^{-1}(\frac{\sqrt{3}}{2})$

$\theta = \frac{\pi}{3}$

b) $\sin^{-1}(\sin \frac{\pi}{3})$

$\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$

$\sin^{-1}(\frac{\sqrt{3}}{2})$ same diagram as above
 $\sin^{-1}(\sin \frac{\pi}{3}) = \frac{\pi}{3}$

c) $\cos^{-1}(\sin \frac{11\pi}{6})$

$\sin \frac{11\pi}{6} = -\frac{1}{2}$

$\cos^{-1}(-\frac{1}{2})$

$\theta_R = \frac{2\pi}{3}$

$\theta = \frac{2\pi}{3}$

d) $\arctan(\cot \frac{4\pi}{3})$

$\cot \frac{4\pi}{3} = \frac{1}{\sqrt{3}}$

$\tan^{-1}(\frac{1}{\sqrt{3}}) = \frac{\pi}{6}$

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

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

5. For what values of x are the following statements true?

a) $\sin(\sin^{-1} x) = x$

always true because $\sin^{-1}(x)$ will always make $-\frac{\pi}{2} \leq \theta \leq \frac{\pi}{2}$

b) $\sin^{-1}(\sin x) = x$

only true if $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$ because x represents the angle in this case.