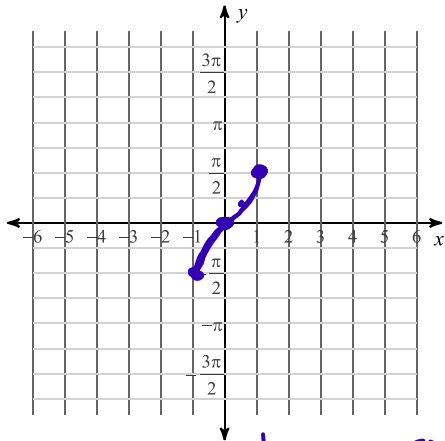


# Inverse Trig Functions Notes

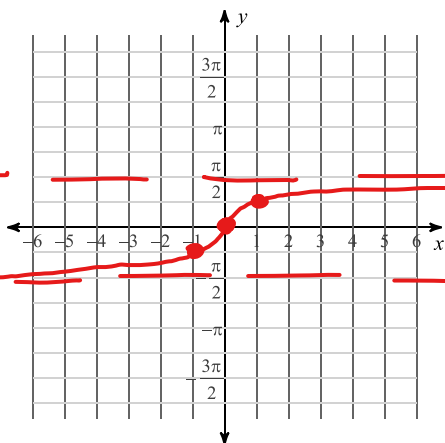
Identify the domain and range of each. Then sketch the graph.

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



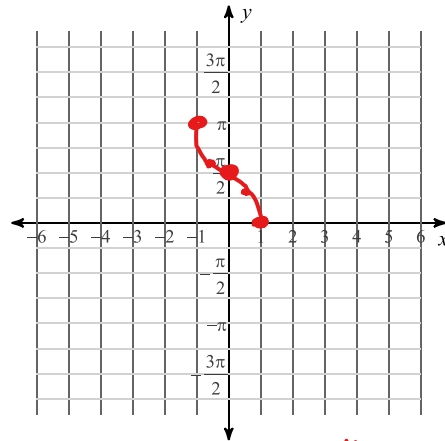
$x=0 \quad y(0) = \sin^{-1} 0 = 0$   
 $x=1 \quad y(1) = \sin^{-1} 1 = \frac{\pi}{2}$   
 $x=-1 \quad y(-1) = \sin^{-1} -1 = -\frac{\pi}{2}$   
 $x=\frac{1}{2} \quad y(\frac{1}{2}) = \sin^{-1}(\frac{1}{2}) = \frac{\pi}{6}$

3)  $y = \tan^{-1} x$



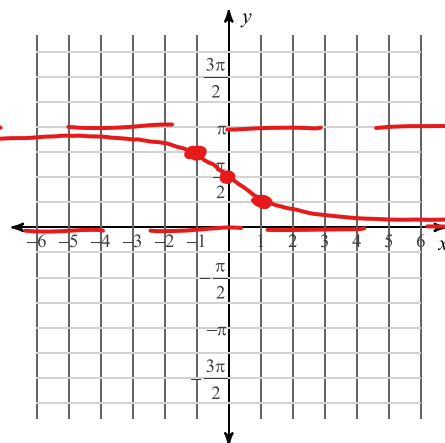
$\tan^{-1}(1) = \frac{\pi}{4}$   
 $\tan^{-1}(-1) = -\frac{\pi}{4}$

2)  $y = \cos^{-1} x$



$\cos^{-1}(0) = \frac{\pi}{2}$  (b/c the cos of  $\frac{\pi}{2}$  is 0)  
 $\cos^{-1}(1) = 0$   
 $\cos^{-1}(\frac{1}{2}) = \frac{\pi}{3}$   
 $\cos^{-1}(-1) = \pi$

4)  $y = \cot^{-1} x$



$\cot^{-1}(1) = \frac{\pi}{4}$   
 $\cot^{-1}(0) = \frac{\pi}{2}$   
 $\cot^{-1}(-1) = \frac{3\pi}{4}$

Find the exact value of each expression.

5)  $\sin^{-1} -\frac{\sqrt{3}}{2}$  this is asking for an angle  
 $-\frac{\pi}{3}$

6)  $\sin^{-1} 1$   
 $\frac{\pi}{2}$

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

8)  $\cos^{-1} \frac{\sqrt{3}}{2}$   
 $\frac{\pi}{6}$

9)  $\cos^{-1} 0$   
 $\frac{\pi}{2}$

10)  $\sin^{-1} -1$   
 $-\frac{\pi}{2}$

11)  $\sec^{-1} -2$   
 $\frac{2\pi}{3}$

12)  $\cot^{-1} (-\sqrt{3})$   
 $\frac{5\pi}{6}$

13)  $\csc^{-1} (-\sqrt{2})$   $-\frac{\pi}{4}$

14)  $\sec^{-1} 0$   
undefined

15)  $\tan^{-1}(\sec 0)$

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

17)  $\sin^{-1} \frac{2\pi}{3}$  *undefined*

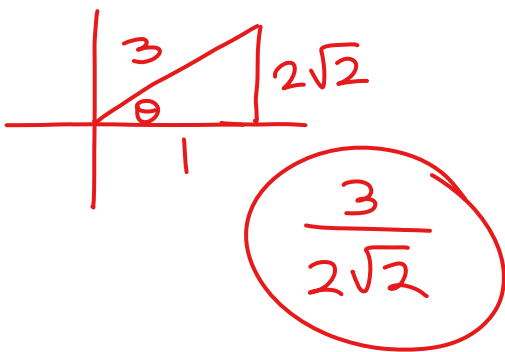
16)  $\cos^{-1}\left(\sin -\frac{\pi}{2}\right)$

$\cos^{-1}(-1) = \pi$

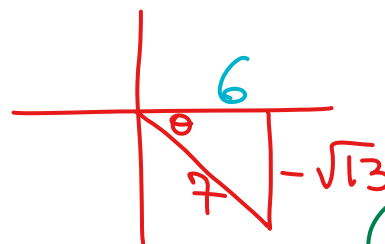
18)  $\csc^{-1}\left(\tan -\frac{\pi}{4}\right)$

$\csc^{-1}(-1) = -\frac{\pi}{2}$

19)  $\csc \boxed{\sec^{-1} 3}$  *osc  $\theta$*



20)  $\cos \sin^{-1}\left(-\frac{\sqrt{13}}{7}\right)$

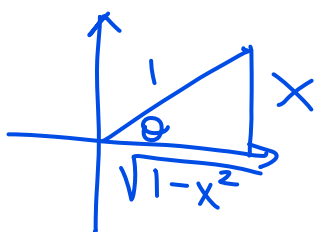


$x^2 + (\sqrt{13})^2 = 7^2$   
 $x^2 + 13 = 49$   
 $x^2 = 36$   
 $x = 6$

$\cos \theta = \frac{6}{7}$

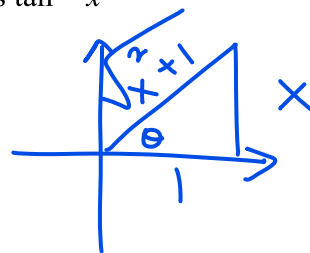
Write each trigonometric expression as an algebraic expression.

21)  $\cot \sin^{-1} x$



$\cot \theta = \frac{\sqrt{1-x^2}}{x}$

22)  $\cos \tan^{-1} x$



$\cos \theta = \frac{1}{\sqrt{x^2+1}}$