

Trigonometry Review

Ex 1) Find the 6 trig functions of each:

a)  $\frac{7\pi}{4}$

~~b)  $\frac{2\pi}{3}$~~

$\sin \frac{7\pi}{4} = -\frac{\sqrt{2}}{2}$

$\csc \frac{7\pi}{4} = -\frac{2}{\sqrt{2}} = -\sqrt{2}$

$\cos \frac{7\pi}{4} = \frac{\sqrt{2}}{2}$

$\sec \frac{7\pi}{4} = \frac{2}{\sqrt{2}} = \sqrt{2}$

$\tan \frac{7\pi}{4} = -1$

$\cot \frac{7\pi}{4} = -1$

Ex 2) Find each of the following:

a)  $\sin\left(-\frac{7\pi}{6}\right)$     b)  $\tan \frac{5\pi}{3}$     c)  $\sec\left(-\frac{3\pi}{4}\right)$

$\frac{1}{2}$

$\frac{-\sqrt{3}}{2} = -\sqrt{3}$

$\frac{-2}{\sqrt{2}}$

Ex 3) Find each of the following, if it exists:

a)  $\sin(-270^\circ)$

b)  $\tan 3\pi$

c)  $\sec(-\pi/2)$

d)  $\tan(3\pi/2)$

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$\frac{0}{-1} = 0$

$\frac{1}{0}$  undef.

$\frac{-1}{0}$  undef.

Ex 4) Find the exact value of each expression without a calculator:

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

b)  $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$   
 $-\frac{\pi}{3}$

c)  $\sin^{-1}\left(\frac{\pi}{2}\right)$  <sup>1.57</sup>  
 $\frac{3\pi}{2}$   
not in domain

d)  $\sin^{-1}\left(\sin\left(\frac{\pi}{9}\right)\right)$  <sup>1st quad</sup>  
 $\frac{\pi}{9}$  <sub>pos.</sub>

not possible

e)  $\sin^{-1}\left(\sin\left(\frac{5\pi}{6}\right)\right)$   
 $\frac{1}{2}$   
 $\frac{\pi}{6}$

f)  $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$   
 $\frac{3\pi}{4}$

g)  $\tan^{-1}(\sqrt{3}) = \frac{\pi}{3}$   
 $\frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$

h)  $\cos^{-1}(\cos(-1.1))$   
4th quad. angle  
pos.

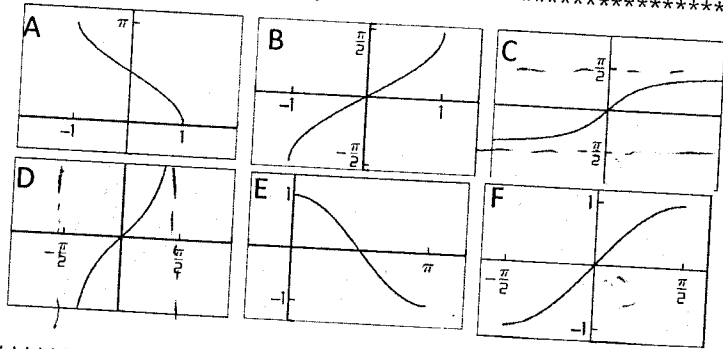
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$\cos^{-1}(\cos(-\pi/4))$   
 $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{\pi}{4}$

## Trigonometry Review

\*\*\*\*\*Which is Which?\*\*\*\*\*

- 1)  $y = \sin x$  **F**
- 2)  $y = \cos x$  **E**
- 3)  $y = \tan x$  **D**
- 4)  $y = \arcsin x$  **B**
- 5)  $y = \arccos x$  **A**
- 6)  $y = \arctan x$  **C**



\*\*\*\*\*

Ex 5) Compose each of the six basic trig functions with  $f(x) = \sin^{-1}x$  and reduce the composite function to an algebraic expression involving no trig functions:

- a)  $\sin(\sin^{-1}x) =$  \_\_\_\_\_      b)  $\cos(\sin^{-1}x) =$  \_\_\_\_\_      c)  $\tan(\sin^{-1}x) =$  \_\_\_\_\_

Ex 6) Simplify each expression below using trig identities:

a)  $\sin^3 x + \sin x \cos^2 x$

b)  ~~$\frac{(\sec x + 1)(\sec x - 1)}{\sin^2 x}$~~

c)  ~~$\frac{\cos x}{1 - \sin x} - \frac{\sin x}{\cos x}$~~

$\sin x (\underbrace{\sin^2 x + \cos^2 x}_1)$

$\sin x$

$0 \leq 3x < 6\pi$   
 $0 \leq x < 2\pi$

Ex 7) Find all values of  $x$  in the interval  $[0, 2\pi)$  that solve each of the following equations:

a)  $2 \sin(3x) = 1$

b)  $2 \sin^2 x + \sin x = 1$

$\sin(3x) = \frac{1}{2}$

$2 \sin^2 x + \sin x - 1 = 0$

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

$(2 \sin x - 1)(\sin x + 1) = 0$

$3x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{13\pi}{6}, \frac{17\pi}{6}, \frac{25\pi}{6}, \frac{29\pi}{6}$

$2 \sin x - 1 = 0$        $\sin x + 1 = 0$

$\sin x = \frac{1}{2}$

$\sin x = -1$

$x = \frac{\pi}{18}, \frac{5\pi}{18}, \frac{13\pi}{18}, \frac{17\pi}{18}, \frac{25\pi}{18}, \frac{29\pi}{18}$

$\frac{\pi}{6}, \frac{5\pi}{6}$

$\frac{3\pi}{2}$  13