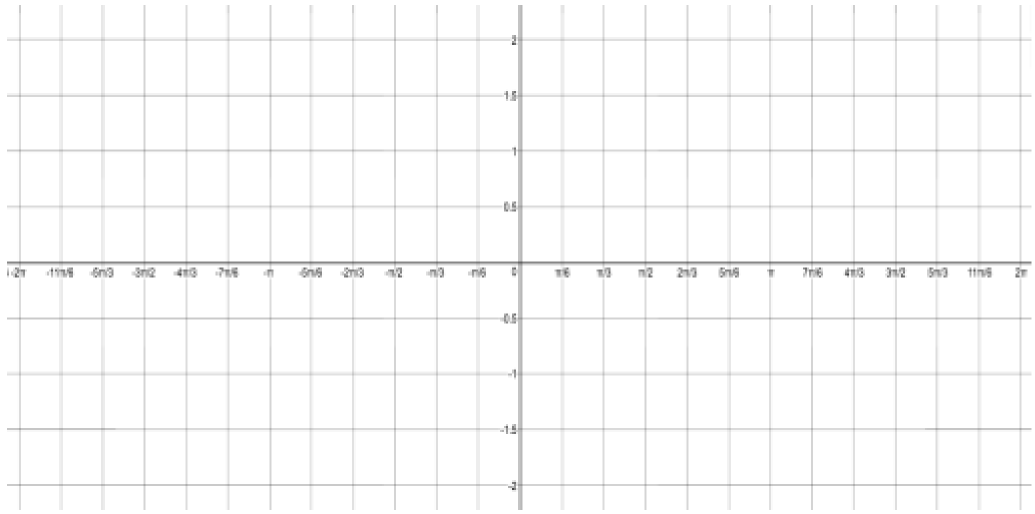
W3 – 5.1/5.2 Graphing Trig Functions
MHF4U
Jensen

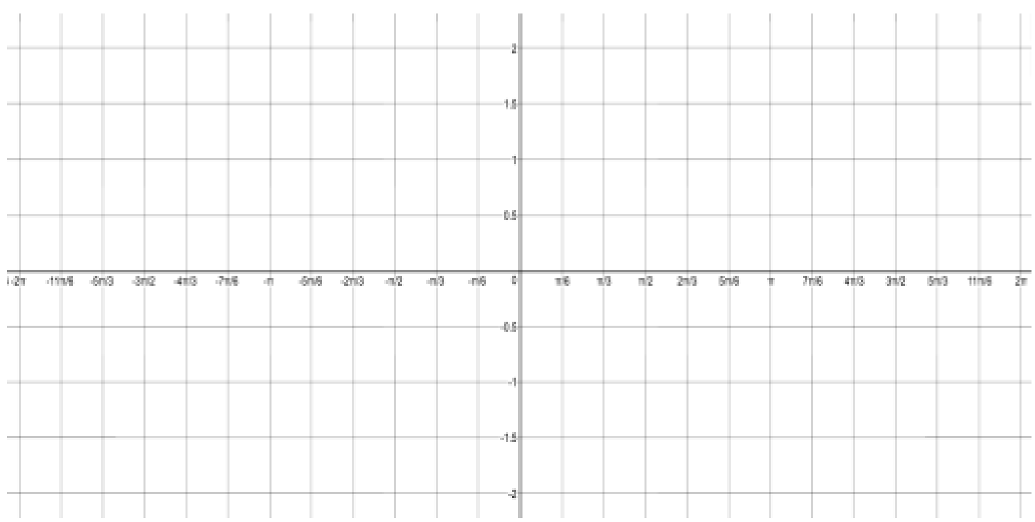
1) Complete the following table of values for the function $f(x) = \sin(x)$ and $g(x) = \csc(x)$. Use special triangles, the unit circle, or a calculator to find values for the function. Then graph both functions on the same grid. Draw asymptotes where necessary.

x	$f(x)$	$g(x)$
0		
$\frac{\pi}{6}$		
$\frac{2\pi}{6} = \frac{\pi}{3}$		
$\frac{3\pi}{6} = \frac{\pi}{2}$		
$\frac{4\pi}{6} = \frac{2\pi}{3}$		
$\frac{5\pi}{6}$		
$\frac{6\pi}{6} = \pi$		
$\frac{7\pi}{6}$		
$\frac{8\pi}{6} = \frac{4\pi}{3}$		
$\frac{9\pi}{6} = \frac{3\pi}{2}$		
$\frac{10\pi}{6} = \frac{5\pi}{3}$		
$\frac{11\pi}{6}$		
$\frac{12\pi}{6} = 2\pi$		



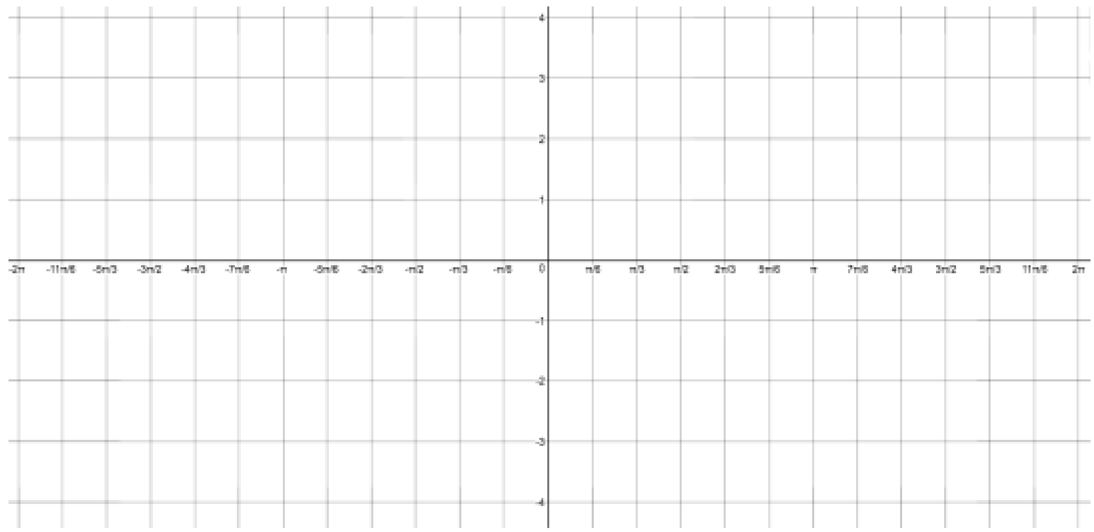
2) Complete the following table of values for the function $f(x) = \cos(x)$ and $g(x) = \sec(x)$. Use special triangles, the unit circle, or a calculator to find values for the function. Then graph both functions on the same grid. Draw asymptotes where necessary.

x	$f(x)$	$g(x)$
0		
$\frac{\pi}{6}$		
$\frac{2\pi}{6} = \frac{\pi}{3}$		
$\frac{3\pi}{6} = \frac{\pi}{2}$		
$\frac{4\pi}{6} = \frac{2\pi}{3}$		
$\frac{5\pi}{6}$		
$\frac{6\pi}{6} = \pi$		
$\frac{7\pi}{6}$		
$\frac{8\pi}{6} = \frac{4\pi}{3}$		
$\frac{9\pi}{6} = \frac{3\pi}{2}$		
$\frac{10\pi}{6} = \frac{5\pi}{3}$		
$\frac{11\pi}{6}$		
$\frac{12\pi}{6} = 2\pi$		



3) Complete the following table of values for the function $f(x) = \tan(x)$. Use the quotient identity to find y-values.

x	$f(x)$
0	
$\frac{\pi}{6}$	
$\frac{2\pi}{6} = \frac{\pi}{3}$	
$\frac{3\pi}{6} = \frac{\pi}{2}$	
$\frac{4\pi}{6} = \frac{2\pi}{3}$	
$\frac{5\pi}{6}$	
$\frac{6\pi}{6} = \pi$	
$\frac{7\pi}{6}$	
$\frac{8\pi}{6} = \frac{4\pi}{3}$	
$\frac{9\pi}{6} = \frac{3\pi}{2}$	
$\frac{10\pi}{6} = \frac{5\pi}{3}$	
$\frac{11\pi}{6}$	
$\frac{12\pi}{6} = 2\pi$	



4) A boat is in the water 150 meters from a straight shoreline. There is a rotating beam on the boat.

a) Determine a reciprocal trigonometric relation for the distance, d, from the boat to where the light hits the shoreline in terms of the angle of rotation x.

b) Determine an exact expression for the distance when $x = \frac{\pi}{6}$

c) Determine an approximate value, to the nearest tenth of a meter, for the distance.

5) A variant on the carousel at a theme park is the swing ride. Swings are suspended from a rotating platform and move outward to form an angle x with the vertical as the ride rotates. The angle is related to the radial distance, r, in meters, from the center of rotation; the acceleration, $g = 9.8$ m/s^2, due to gravity; and the speed, v, in meters per second, of the swing, according to the formula

$$\cot x = \frac{rg}{v^2}$$

Determine the angle x for a swing located 3.5 meters from the center of rotations and moving at 5.4 m/s, to the nearest hundredth of a radian.

6) Explain the difference between $\csc \frac{1}{\sqrt{2}}$ and $\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$

<u>Answer Key</u>

See posted solutions for #1-3

4)a) $d = 150 \sec x$ **b)** $\frac{300}{\sqrt{3}}$ m **c)** 173.2 m

5) 0.70

6) The cosecant function is the reciprocal of the sine function. For sin^{-1}, the -1 is NOT an exponent but instead a notation meaning the opposite operation of sine. The sine function takes an angle for an input and gives a ratio as an output. sin^{-1} takes a ratio for an input and gives the angle as an output.