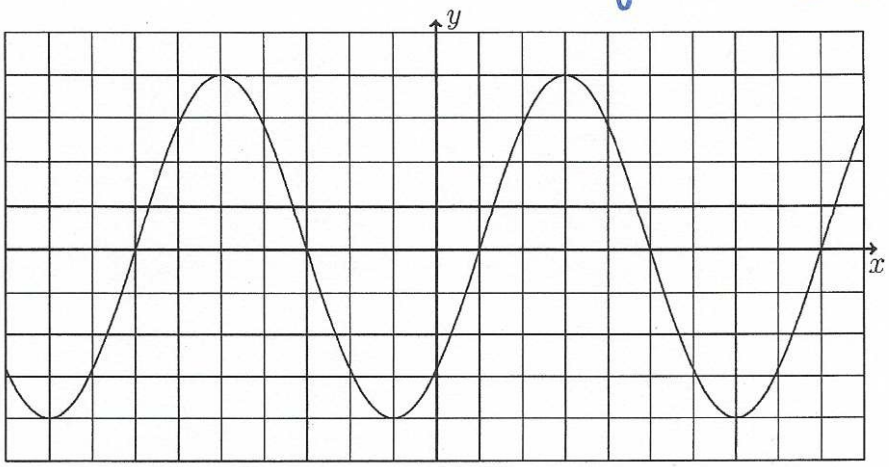
MTH 130 Precalculus, Classwork 16 **Fall 2014**

(1) Find an equation describing the following graph.

$y = 4\sin\left(\frac{\pi}{4}(x-1)\right)$.



period 8

period $= \frac{2\pi}{k} = 8$

$\Rightarrow k = \frac{\pi}{4}$

(2) A ferris wheel has a radius of 11m and the bottom of the wheel passes 1m above the ground. If the ferris wheel makes one complete revolution every 20s, find an equation that gives the height above the ground of a person on the ferris wheel as a function of time, assuming at $t = 0$ person starts at bottom (i.e. height 1m). (Hint: draw pictures).

(3) Find exact values for:

(a) $\sin^{-1}(\sin(\pi/6))$

(b) $\cos^{-1}(\cos(-\pi/6))$

(c) $\tan^{-1}(\tan(7\pi/6))$

(d) $\cos(\sin^{-1}(\sqrt{2}/2))$

(e) $\tan(\sin^{-1}(\sqrt{2}/2))$

a) $\sin^2 y + \cos^2 y = 1$; $\tan^2 y + 1 = \sec^2 y = \frac{1}{\cos^2 y}$

$\frac{1}{1-\sin^2 y} = \frac{1}{\cos^2 y} = \sec^2 y = 1 + \tan^2 y$.

(4) Verify:

(a) $\frac{1}{1-\sin^2 y} = 1 + \tan^2(y)$

(b) $(1-\cos^2 x)(1+\cot^2 x) = 1$

(c) $\frac{\sin(x)+\cos(x)}{\sec(x)+\csc(x)} = \sin(x)\cos(x)$

b) $(1-\cos^2 x)(1+\cot^2 x)$

$= 1 + \cot^2 x - \cos^2 x - \cos^2 x \cot^2 x$

$= 1 + \cot^2 x - \cos^2 x - \cos^2 x$

$= \sin^2 x \left(1 + \frac{\cos^2 x}{\sin^2 x}\right)$.

$= \sin^2 x + \cos^2 x = 1$.

c) $\frac{\sin(x)+\cos(x)}{\frac{1}{\cos x} + \frac{1}{\sin x}} = \frac{\sin(x)+\cos(x)}{\frac{\sin x + \cos x}{\sin x \cos x}} = \sin(x)\cos(x)$.