Standard 7B Review: Name: _____ Per: ____

1. Give the amplitude, the period, and the direction and distance of any shifts or reflections that the graph of sin(x) would undergo to the following graphs.

a. $y = -3\sin\left(\frac{\pi}{2}(x+\pi)\right) - 4$

flip over x

amp = |a| = 3

Per $= \frac{2\pi}{b} = \frac{2\pi}{\pi/2} = 4$

Phase shift left π

Vert shift: down 4

b. $y = 5\tan(-2x) + 3$

flip over y

Per $= \frac{\pi}{b} = \frac{\pi}{2}$

2. Match each equation with its graph. All graphs have the same axes.

a. $\frac{3}{2}\sec\left(\frac{\pi x}{2}\right)$ _____

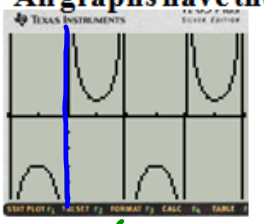
b. $\frac{1}{2}\tan(x)$ VI

c. $2\csc(x) - 1$ I

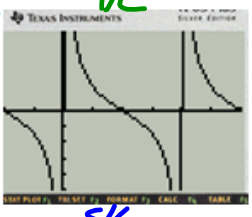
d. $2\tan\left(\frac{\pi x}{2}\right)$ II

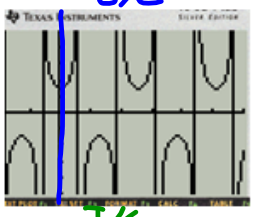
e. $\sec\left(\frac{x}{2}\right) + 1$ V

f. $\frac{3}{2}\cot\left(\frac{x}{2}\right)$ III

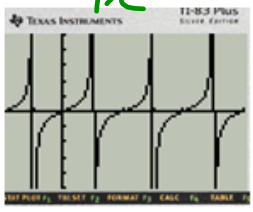
I. 

II. 

III. 

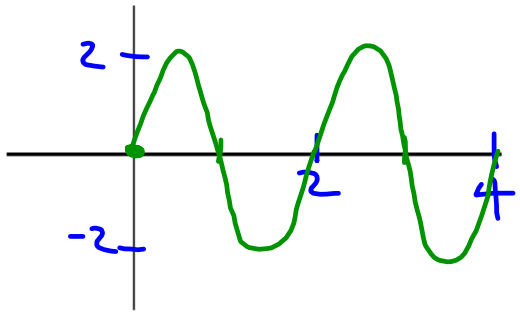
IV. 

V. 

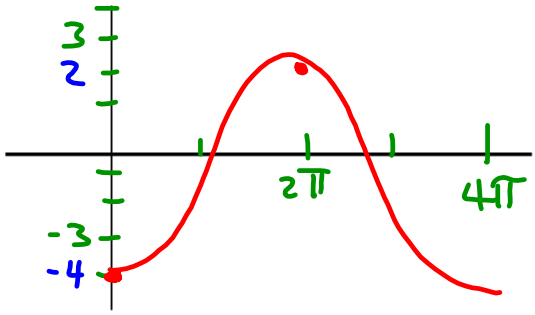
VI. 

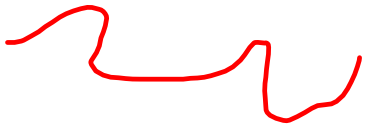
3. Sketch the following Graphs including correctly labeling the axes.

a. $y = 2\sin(\pi x)$ amp = 2, per = $\frac{2\pi}{\pi} = 2$



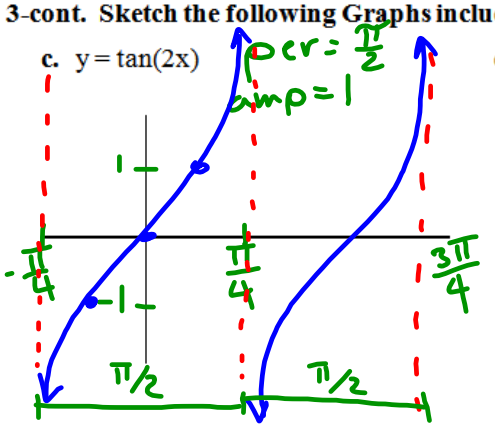
b. $y = -3\cos(\frac{x}{2}) - 1$ amp = 3, down 1, Per = $\frac{2\pi}{\frac{1}{2}} = 4\pi$, Flip x



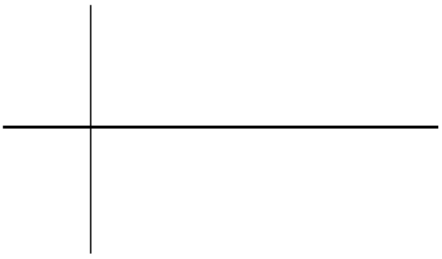


3-cont. Sketch the following Graphs including correctly labeling the axes.

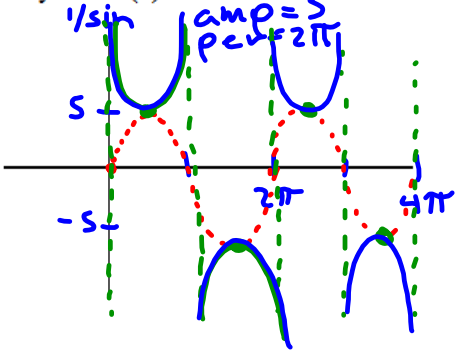
c. $y = \tan(2x)$ per: $\frac{\pi}{2}$, amp = 1



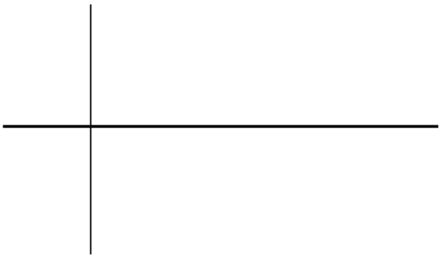
d. $y = \frac{1}{2}\cos(\frac{\pi x}{3})$ b = π/3, $\frac{2\pi}{\frac{\pi}{3}} = 6$



e. $y = 5\csc(x)$ 1/sin, amp = 5, per = 2π



f. $y = 3\cot(\frac{x}{2})$



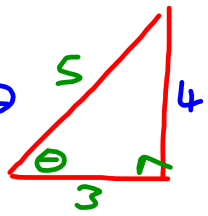
arccos = $\cos^{-1}$

4. Find the exact value of the expression by sketching the appropriate right triangle.

a. $\sin(\arccos\frac{3}{5})$

$\cos^{-1}(3/5)=\theta$

$\cos\theta = 3/5$



$\sin\theta = \frac{4}{5}$

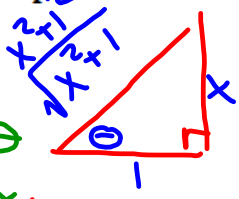
b. $\tan(\csc^{-1}\frac{\sqrt{10}}{3})$

5. Write the algebraic expression for each expression by sketching the appropriate right triangle.

a. cos(arctan x)

$\tan^{-1}x=\theta$

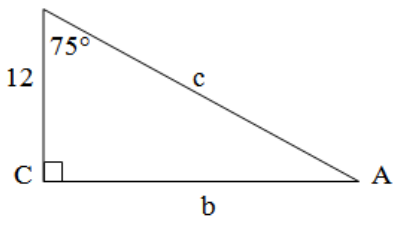
$\tan\theta = x/1$



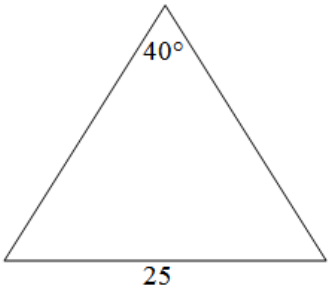
$\cos\theta = \frac{1}{\sqrt{x^2+1}} = \frac{\sqrt{x^2+1}}{x^2+1}$

b. $\tan(\sin^{-1}\frac{x}{3})$

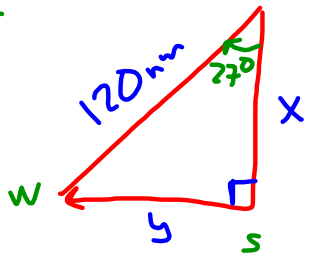
6. Solve the right triangle.



7. Find the Altitude.



8. A ship leaves port at noon and has a bearing of S 27° W. If the ship is sailing at 20 knots, how many nautical miles south and how many nautical miles west has the ship sailed by 6:00pm?



$\cos 27^\circ = \frac{x}{120}$

$120\cos 27^\circ = x$

$= 106.9$nm south

$\sin 27^\circ = \frac{y}{120}$

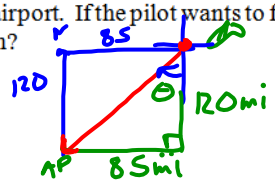
$120\sin 27^\circ = y = 54.5$nm West

9. A plane is 120 *miles* north and 85 *miles* east of an airport. If the pilot wants to fly directly to the airport, what bearing should be taken?

S 35.3° W

$\tan\theta = \frac{85}{120}$

$\tan^{-1}\left(\frac{85}{120}\right) = \theta = 35.3°$



10. For the simple harmonic motion described by the following functions, find (1) the maximum displacement, (2) the period, and (3) the frequency.

a. $d = 7.5\sin 60\pi t$ $2\times a = 15$

b. $d = \frac{1}{2}\cos 16t$ $P = \frac{2\pi}{16} = \frac{\pi}{8}$ $f = \frac{8}{\pi}$

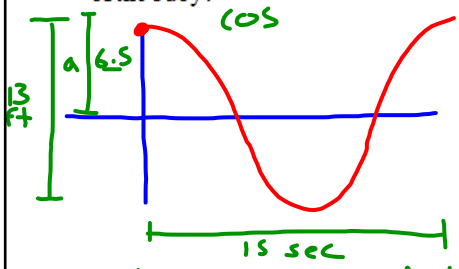
Per $= \frac{2\pi}{60\pi} = \frac{1}{30}$ sec/cycle

freq = 30 cycle/sec

$d = a$ sin/cos ωt

displacement = 1

11. A buoy oscillates in simple harmonic motion as waves go past. It is noted that the buoy moves a total of 13*ft* from its low point to its high point. If it starts at and returns to its high point every 15 seconds, write an equation that describes the motion of the buoy?



$d = 6.5\cos\frac{2\pi}{15}t$

Period = seconds/cycle $\frac{2\pi}{\omega} = 15$ $\frac{2\pi}{15} = \omega$

frequency = cycles/sec $\frac{\omega}{2\pi}$