Pre Calculus
Review 4B (4.4-4.8)

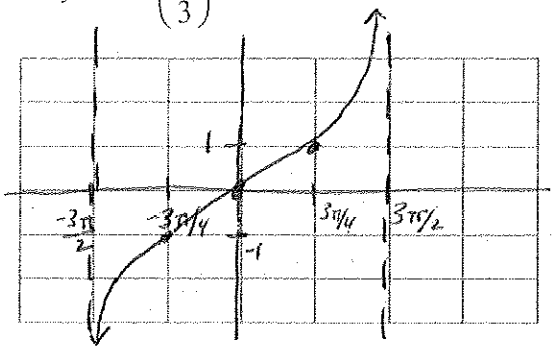
Name: KEY
Block: _____

Non-Calculator

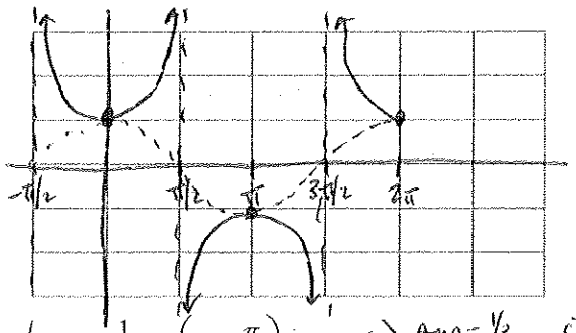
Show all work for credit!!

Graph each function without a calculator. State the (a) amplitude, (b) period, (c) phase shift and (d) vertical shift. Label each axis.

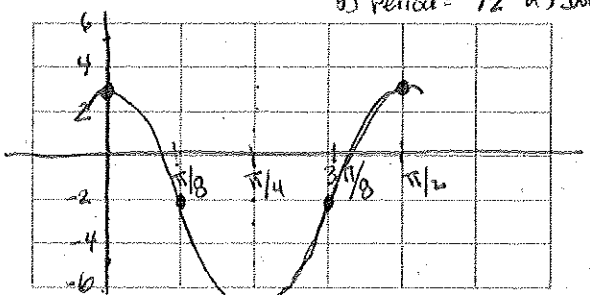
1. $y = \tan\left(\frac{x}{3}\right)$ a) N/A b) PERIOD = 3π c) none d) none



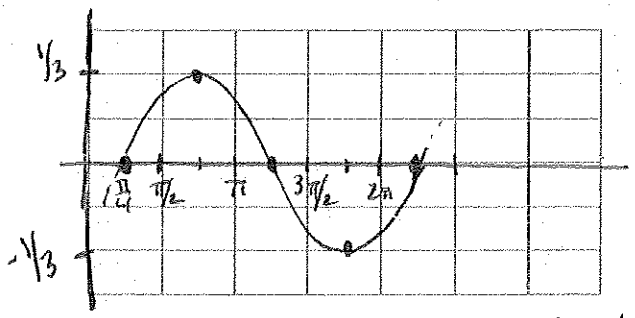
2. $y = \sec x$ a) N/A b) Period = 2π c) none d) none



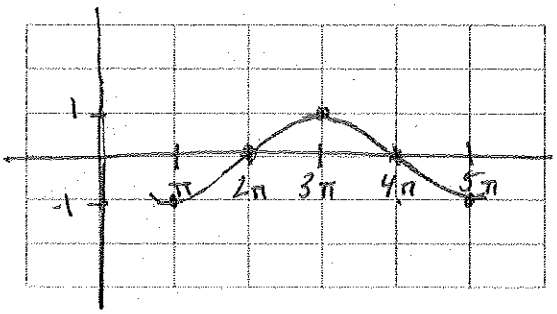
3. $y = 5\cos(4x) - 2$ a) amp = 5 b) Period = $\pi/2$ c) none d) Down 2



4. $y = \frac{1}{3}\sin\left(x - \frac{\pi}{4}\right)$ a) Amp = 1/3 b) Period = 2π c) Right $\pi/4$ d) None



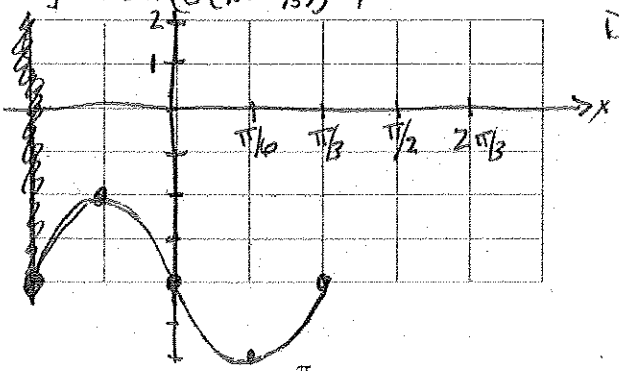
5. $y = -\cos\left(\frac{x}{2} - \frac{\pi}{2}\right) = -\cos\left(\frac{1}{2}(x - \pi)\right)$



Reflect over x-axis
Period = 4π
Amp = 1
Right π

6. $y = 2\sin(3x + \pi) - 4$ Amp = 2 Period = $2\pi/3$ Left $\pi/3$ Down 4

$y = 2\sin(3(x + \pi/3)) - 4$

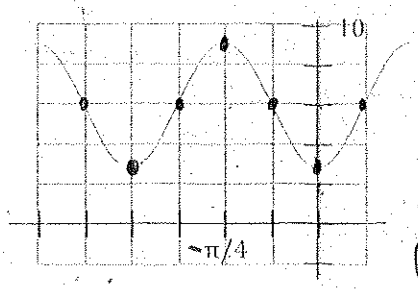


7. Write the equation(s) of the cosine function with amplitude 5, period 3π, phase shift $-\frac{\pi}{6}$, and vertical shift of 1.

$\frac{2\pi}{b} = 3\pi$
$2 = 3b$
$\frac{2}{3} = b$

$y = 5\cos\left(\frac{2}{3}(x + \pi/6)\right) + 1$

8. Write the equation of the function shown below…



Amp = 3
Period = $\frac{\pi}{2}$

$y = 3\cos\left(4\left(x + \frac{\pi}{2}\right)\right) + 6$

OR $y = -3\cos(4x) + 6$

OR $y = 3\sin\left(4\left(x + \frac{3\pi}{8}\right)\right) + 6$

$\frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$

Find the exact value. *Express your angle answers in radian measure.*

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

45° & QI

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

(0, -1)

11. $\arctan\left(\sqrt{3}\right)$

60° & QI → $\frac{\pi}{3}$

12. $\sin\left[\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right]$

30° & QII

$\sin\left(\frac{5\pi}{6}\right)$

$\frac{1}{2}$

13. $\cos^{-1}\left[\cos\left(\frac{4\pi}{3}\right)\right]$

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

60° & QII

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

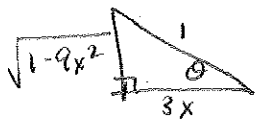
14. $\arcsin\left[\tan\left(\frac{3\pi}{4}\right)\right]$

$\sin^{-1}(-1)$

$-\frac{\pi}{2}$

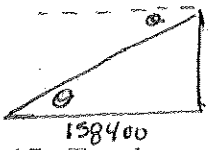
15. Find an algebraic expression equivalent to $\sin(\arccos 3x)$

$\sin(\theta) = \sqrt{1-9x^2}$



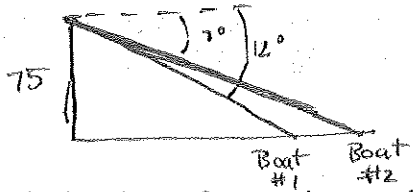
Calculator Allowed

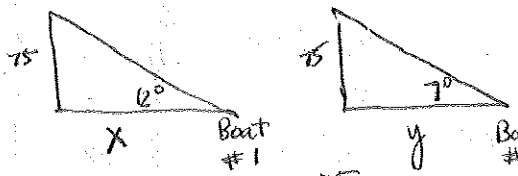
16. A plane is 8000 feet above the ground when it begins its final approach to a runway. If the ground distance to the end of the runway is 158400 feet, what is the angle of descent to the end of the runway?



$\tan\theta = \frac{8000}{158400}$ $\theta = \tan^{-1}\left(\frac{8000}{158400}\right) \approx 2.891°$

17. Two boats are observed from a tower 75 meters above a lake. The angles of depression are 12° and 7°. How far apart are the boats?





$\tan 12° = \frac{75}{x} \Rightarrow x = \frac{75}{\tan 12°}$ $\tan 7° = \frac{75}{y} \Rightarrow y = \frac{75}{\tan 7°}$

Distance Apart:

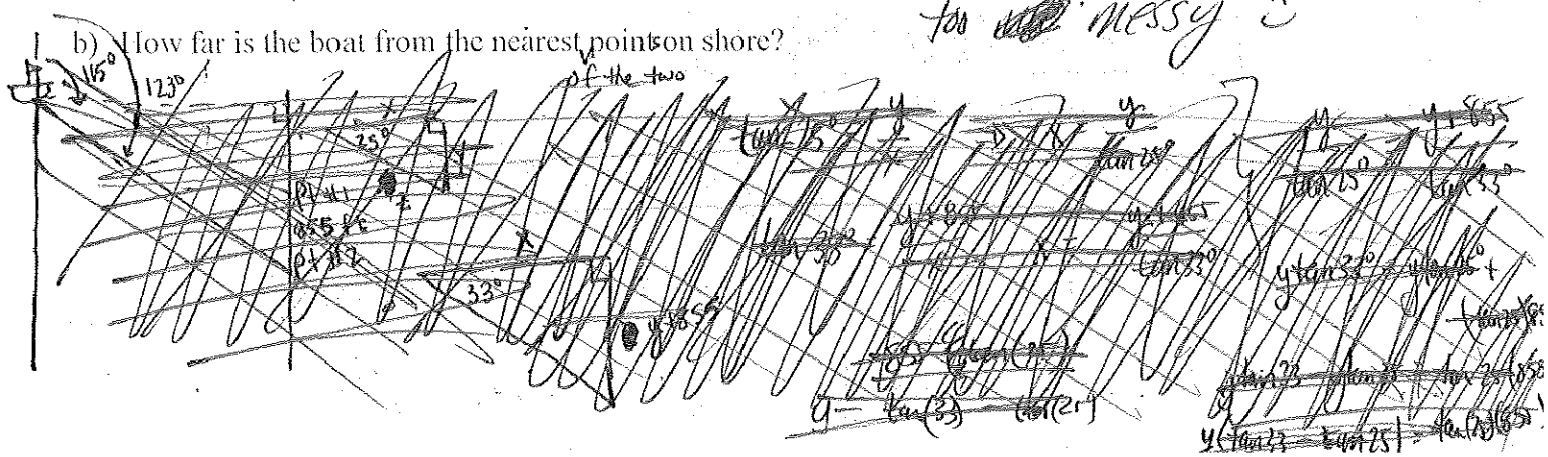
$y - x = \frac{75}{\tan 7°} - \frac{75}{\tan 12°} \approx 257.979$ meters

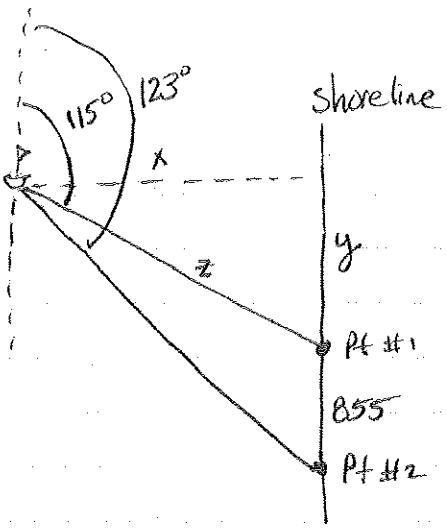
18. The bearings of two points on the shore from a boat are 115° and 123°. The two points on shore are 855 ft apart, the shore is straight and runs north-south.

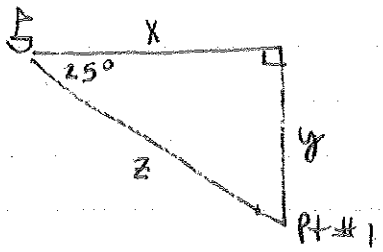
a) How far is the boat from the shore?

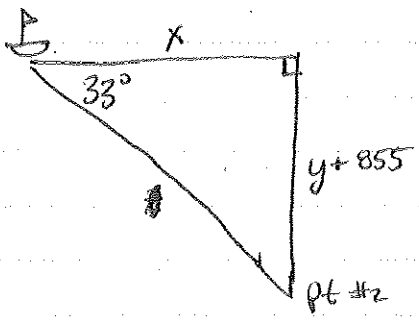
b) How far is the boat from the nearest point on shore?

see next page ... too messy :(









$\tan 25° = \frac{y}{x} \Rightarrow x \tan 25° = y$

$\tan 33° = \frac{y+855}{x} \rightarrow \tan 33° = \frac{(x \tan 25° + 855)}{x}$

$x \tan 33° = x \tan 25° + 855$

$x \tan 33° - x \tan 25° = 855$

$x(\tan 33° - \tan 25°) = 855$

$x = \frac{855}{\tan 33° - \tan 25°}$

(a) $x \approx 4669.581121$ feet

(b) $\cos 25° = \frac{x}{z}$

$\Rightarrow z = \frac{x}{\cos 25°} = \frac{4669.581121}{\cos 25°} \approx 5152.3127$ feet