Review Packet KEY

Sunday, January 25, 2015 5:24 PM

Pre-Calc
Review Packet
Section 4.4, 4.5, 4.7

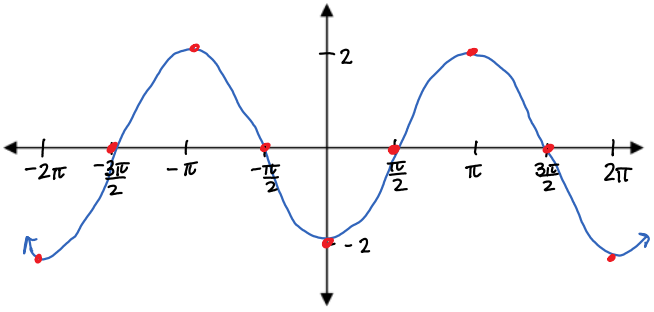
Name Key

Date _____ Period _____

Part I: Sketch a graph of the following without using your calculator.

1) $y = -2\cos(x)$

$P = 2\pi$



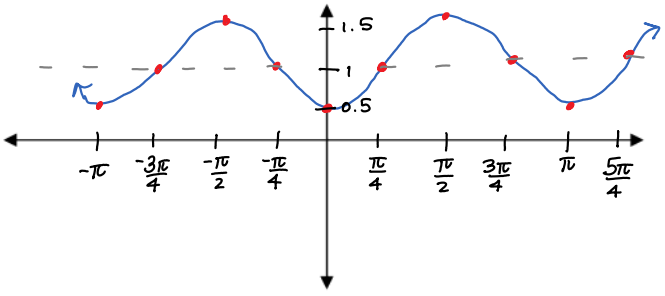
2) $y = \frac{1}{2}\sin\left(2x - \frac{\pi}{4}\right) + 1$

$P = \frac{2\pi}{2} = \pi$

axis: $y = 1$

$\rightarrow \frac{\pi}{4}$

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



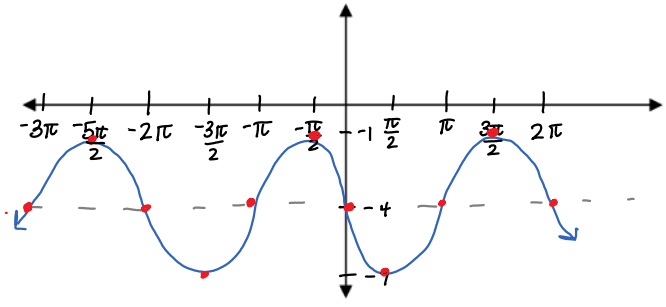
3) $y = 3\sin(x + \pi) - 4$

$P = \frac{2\pi}{1} = 2\pi$

axis = $y = -4$

$\leftarrow \pi$

$a = 3$



Part III: Describe the transformations that were performed on the original function to create the new function.

1) $y = -\frac{1}{2}\cos(3x - \pi)$

Transformations: vertical
- Flip over x-axis
- v. shrink bafo $\frac{1}{2}$

horizontal
- $\rightarrow \pi$
- h. shrink bafo 1/3

Period $\frac{2\pi}{3}$ Amplitude $\frac{1}{2}$

2) $y = -\sin\left(\frac{1}{4}x - 10\right) + 3$

Transformations: vertical
- Flip over x-axis
- $\uparrow 3$

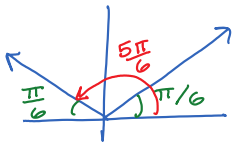
horizontal
- $\rightarrow 10$
- h. stretch bafo 4

Period 8π Amplitude 1

Part IV: Without using your calculator, solve the equations over the given interval. Express your answers in radians.

1) $\sin x = \frac{1}{2}$, $[0, 2\pi]$ y⊕ is quad I & II

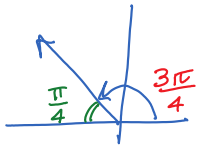
$x = \sin^{-1}\left(\frac{1}{2}\right) \Rightarrow y = \frac{1}{2}$ @ 30°



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

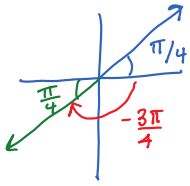
2) $\cos x = -\frac{\sqrt{2}}{2}; \left[\frac{\pi}{2}, \pi\right]$ quad 2

$x = \cos^{-1}\left(-\frac{\sqrt{2}}{2}\right) \Rightarrow x = -\frac{\sqrt{2}}{2}$ @ 45° (135° in quad 2)



$x = \frac{3\pi}{4}$

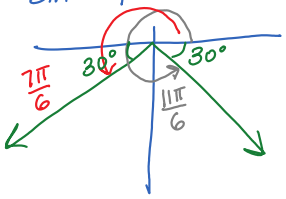
3) $\tan x = 1; [-\pi, \pi] \Rightarrow [-180°, 180°]$



$x = \frac{\pi}{4}, -\frac{3\pi}{4}$

4) $\csc x = -2$, $[0, 2\pi]$

$\frac{1}{\sin} = \frac{-2}{1} \Rightarrow \sin x = -\frac{1}{2}$ Sin⊖ in quad 3 & 4

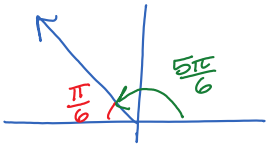


$y = \frac{1}{2}$ @ 30°

$x = \frac{7\pi}{6}, \frac{11\pi}{6}$

5) $\cot x = -\sqrt{3}; \left[\frac{\pi}{2}, \pi\right]$ → quad 2

$\frac{1}{\tan x} = \frac{-\sqrt{3}}{1} \Rightarrow \tan x = \frac{1}{-\sqrt{3}}$



$x = \frac{5\pi}{6}$

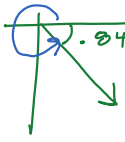
Part V: Use a calculator to solve the following equations over the given interval. RADIAN MODE

1) $\sin x = \frac{3}{4}; \left[0, \frac{\pi}{2}\right]$ quad I

$x \approx .85$

2) $\cos x = \frac{2}{3}; [0, 2\pi]$ cos⊕ in quad I & IV

$x \approx .84, 5.44$



$2\pi - .84 =$

3) $\csc x = -1.5; \left[\pi, \frac{3\pi}{2}\right]$ quad 3

$\sin x = -\frac{1}{1.5}$

$x = -.73$ (quad 4)

$\pi + .73 = 3.87$

Part VI: Use a calculator to find an approximate value (round to two decimal places and answer in radians).

1) $\sin^{-1} .8$

.93

2) $\cos^{-1} \frac{2}{5}$

1.16

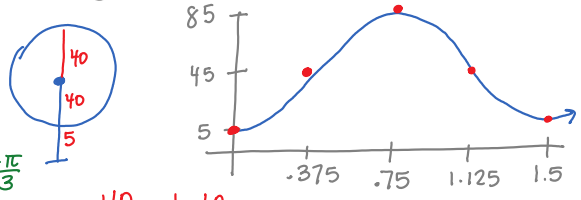
3) $\cot^{-1} 23$

$\tan^{-1}\left(\frac{1}{23}\right)$

.04

Part VII: Write a sinusoidal equation to describe the following situation. Then, use your equation to answer the accompanying questions.

1) A Ferris wheel is 80 feet in diameter and its center is 45 feet above the ground. It takes the Ferris wheel 1.5 minutes to complete a revolution.



a) Equation: $y = -40\cos\left(\frac{4\pi}{3}x\right) + 45$

$P = \frac{2\pi}{b}$ $\quad 1.5 = \frac{2\pi}{b}$

$\frac{3}{2} = \frac{2\pi}{b} \Rightarrow b = \frac{4\pi}{3}$

b) After how many ***seconds*** will the rider be at a height of 50 feet? .40, 1.10 min (on first revolution)

$50 = -40\cos\left(\frac{4\pi}{3}x\right) + 45$

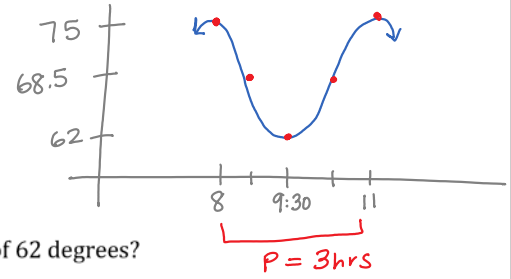
c) How high will the rider be after 1 **minute** into the ride? 65 ft

$x = 1$

d) Determine another equation (sine or cosine; whichever on you didn't use in part a) to represent the same situation.

$y = 40\sin\left(\frac{4\pi}{3}x - .375\right) + 45$

2) The temperature in your classroom fluctuates sinusoidally. You decide to start recording some data to present to the Board of Education in your plea for rooms with consistent temperature. At 8am, the room is at a high temperature of 75 degrees (F). Your friend records the temperature at 9:30 to be at a low of 62 degrees. (Note, the day ***really*** starts at midnight or 12 am. Be sure to adjust your graph and solutions accordingly!)



a) Equation: $y = -6.5\cos\left[\frac{2\pi}{3}x - 9.5\right] + 68.5$

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

b) What will the temperature be at 3:00pm? 65.25°

$x = 15$

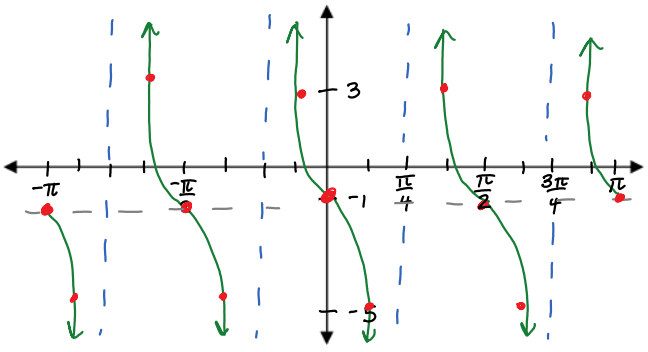
c) When is the ***first*** time the temperature will reach its low value of 62 degrees?

12:30am

Part VIII: Sketch 2 periods of each of the following functions. Plot specific points and be as accurate as possible. (No calculators)

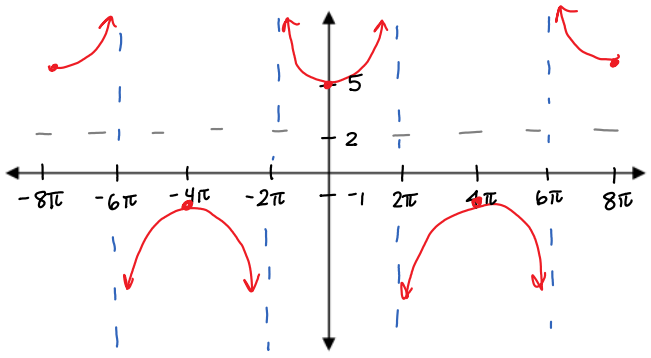
1) $y = -4\tan 2x - 1$ $\quad \tan = \frac{\sin}{\cos}$

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



2) $y = 3\sec\frac{x}{4} + 2$ $\quad \sec = \frac{1}{\cos}$

$\frac{2\pi}{\frac{1}{4}} = 8\pi$



Part IX: Find the exact values of each of the following. Remember to keep in mind the domains and ranges for the inverse functions. (No Calculator)

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

$45°, \frac{\pi}{4}$

2) $\tan^{-1}(-1)$

$-45°, -\frac{\pi}{4}$

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

$\sec\left(\frac{3\pi}{4}\right)$

$\uparrow$

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

$\downarrow$

$\sec = \frac{-2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \boxed{-\sqrt{2}}$

4) $\sin\left[\tan^{-1}(1)\right]$

$\sin\left(\frac{\pi}{4}\right) = \boxed{\frac{\sqrt{2}}{2}}$