Math 4 Graphing Trig
Notes- 3.04 Application of Trig Functions

Name_____

To find the equation given a graph you are going backwards from graphing.

Reminder: How do you find each when graphing $f(x)=a\sin(bx+c)+d$ or $f(x)=a\cos(bx+c)+d$?

Amplitude: a - distance from sinusoidal to highs/lows
Period: distance from start to end $P=\frac{2\pi}{b}$
Vertical Shift: d - where sinusoidal asymptote is
Horizontal Shift: start point $=-\frac{c}{b}$

a.) Find a +sin(x) function:

Amplitude: 2 $a=+2$
Period: π $b=+2$
VS: 3 $d=+3$
HS: $-\frac{5\pi}{6}$ $c=\frac{5\pi}{3}$

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

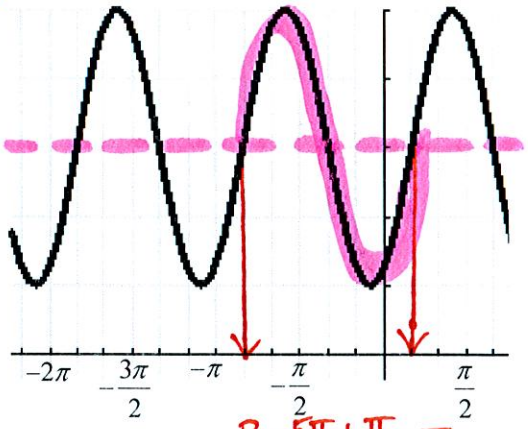
$\pi b=2\pi$

$b=2$

$-2\left(-\frac{5\pi}{6}\right)=\left(+\frac{c}{2}\right)+2$

$c=\frac{10\pi}{6}=\frac{5\pi}{3}$

$f(x)=2\sin\left(2x+\frac{5\pi}{3}\right)+3$

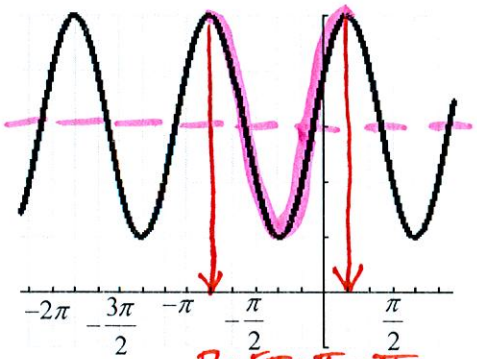


$P=\frac{5\pi}{6}+\frac{\pi}{6}=\pi$

b.) Find a +cos(x) function:

Amplitude: 2 $a=+2$
Period: π $b=+2$
VS: 3 $d=+3$
HS: $-\frac{5\pi}{6}$ $c=\frac{5\pi}{3}$

$f(x)=2\cos\left(2x+\frac{5\pi}{3}\right)+3$



$P=\frac{5\pi}{6}+\frac{\pi}{6}=\pi$

c.) Find a -cos(x) function:

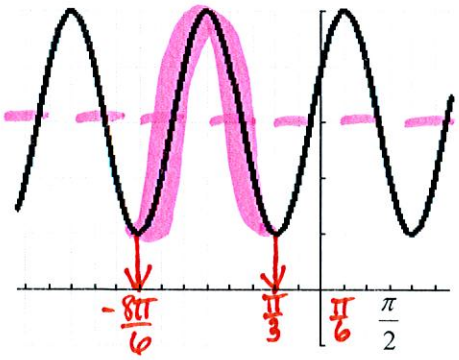
2 = Amplitude: $a=-2$
π = Period: $b=2$
3 = VS: $d=3$
$-\frac{4\pi}{3}$ = HS: $c=\frac{8\pi}{3}$

$HS=-\frac{c}{b}$

$-2\left(-\frac{4\pi}{3}\right)=\left(-\frac{c}{2}\right)-2$

$c=+\frac{8\pi}{3}$

$f(x)=-2\cos\left(2x+\frac{8\pi}{3}\right)+3$



$P=\frac{8\pi}{6}-\frac{2\pi}{6}=\frac{6\pi}{6}=\pi$

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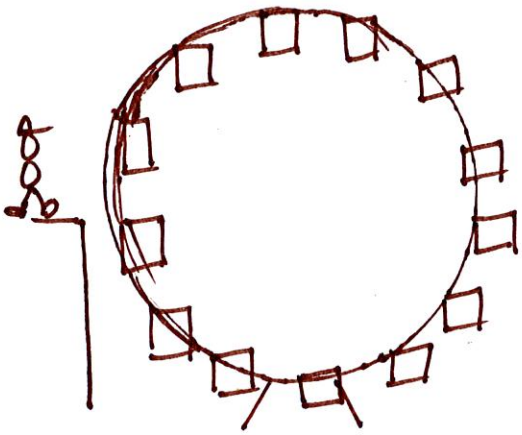
Name_____

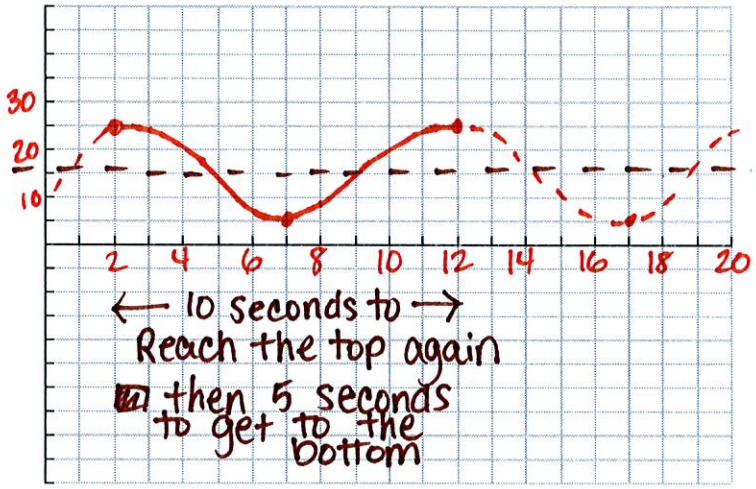
Ferris Wheel Problem As you ride the Ferris wheel, your distance from the ground varies sinusoidally with time. Let *t* be the number of seconds that have elapsed since the Ferris wheel started. You find that it takes you 2 seconds to reach the top, 25 feet above the ground, and that the wheel makes a revolution once every 10 seconds. The diameter of the wheel is 20 feet.

a. Sketch a graph of this sinusoid.
b. Write an equation of the sinusoid.
c. What is the lowest you go as the Ferris wheel turns, and why is this number greater than zero?
d. Predict your height above the ground when

i. $t = 3$
ii. $t = 6$
iii. $t = 9$



a.



b.) eqn.

Amp. 10 $a = 10$
Period 10 $b = \frac{\pi}{5}$
VS 15 $d = 15$
HS 2 $c = -\frac{2\pi}{5}$

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

$\frac{10}{1} = \frac{2\pi}{b}$

$\frac{10b}{10} = \frac{2\pi}{10}$

$b = \frac{\pi}{5}$

$HS = -\frac{c}{b}$

$-\frac{\pi}{5}(2) = \left(-\frac{c}{\frac{\pi}{5}}\right)\frac{\pi}{5}$

$c = -\frac{2\pi}{5}$

$f(x) = 10\cos\left(\frac{\pi}{5}x - \frac{2\pi}{5}\right) + 15$

c.) 5 feet. Because the cars do not scrape the ground as the wheel goes around.

d.) $f(3) = 10\cos\left(\frac{\pi}{5}\cdot 3 - \frac{2\pi}{5}\right) + 15 = 23.09$ feet

$f(6) = 10\cos\left(\frac{\pi}{5}\cdot 6 - \frac{2\pi}{5}\right) + 15 = 6.909$ feet

$f(9) = 10\cos\left(\frac{\pi}{5}\cdot 9 - \frac{2\pi}{5}\right) + 15 = 11.91$ feet