GSE PreCalculus
Notes- Applications of Trig Functions

Name Key

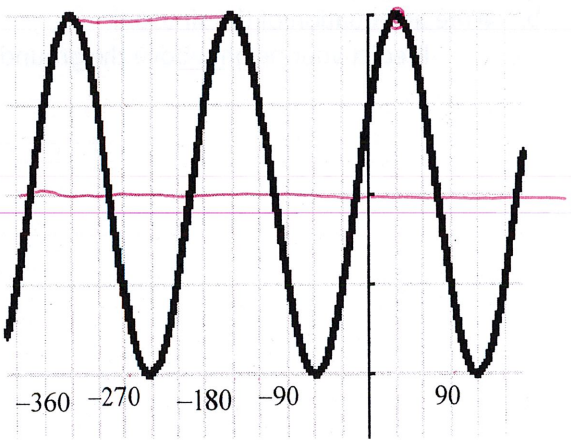
To find the equation given a graph you are going backwards from graphing.

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

Example 1: Find a +cos(x) function (degrees):
Amplitude (a): 2
Period (b): $-150-(-330) = 180$

$b=2$

HS (c): $30°$
VS (d): 2



$f(x) = 2\cos 2(x-30°)+2$

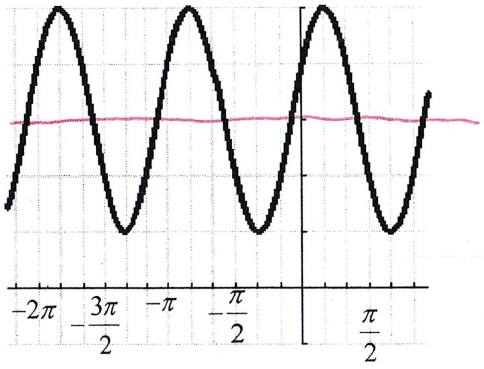
or

$f(x) = 2\cos(2x-60°)+2$

Example 2: Find a +cos(x) function (radians)
Amplitude (a): 2
Period (b): π

$b=2$

HS (c): $\pi/6$
VS (d): 3



$f(x) = 2\cos 2(x-\pi/6)+3$

or

$f(x) = 2\cos(2x-\pi/3)+3$

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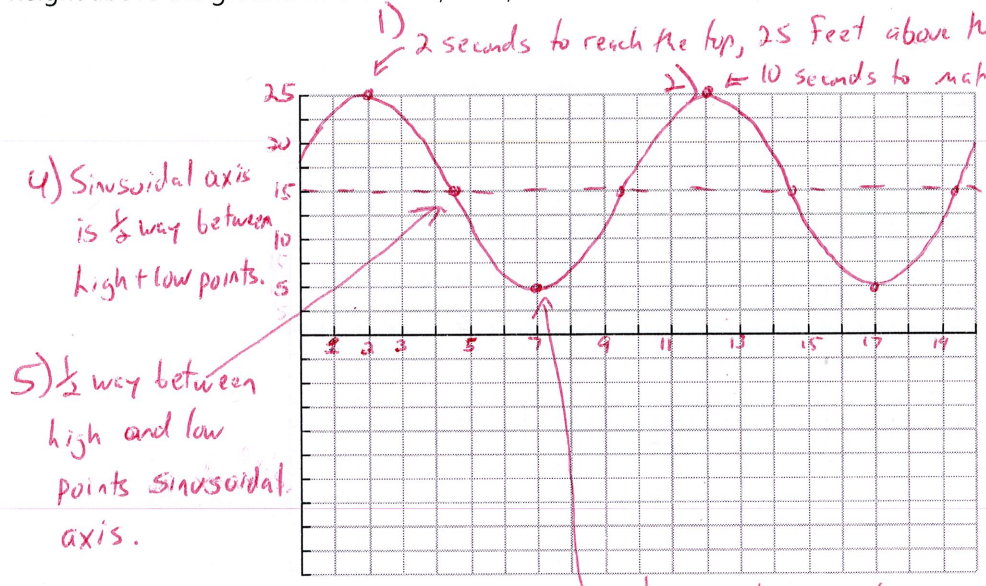
Ferris Wheel Problem As you ride the Ferris wheel, your distance from the ground varies sinusoidally with time. Let t be the number of seconds that have elapsed since the Ferris wheel started. You find that it takes you 2 seconds to reach the top, 25 feet above the ground, and that the wheel makes a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

i. Predict your height above the ground when: $t = 3$, $t = 6$, $t = 9$

a)



b) $a = 10$

$b = \frac{360}{b} = 10$; $b = 36$

$y = 10 \cos 36(x-2) + 15$

$C = \text{Cos} = 2$

$d = 15$

i) a) $y = 10(\cos 36(3-2) + 15 \approx 23.09$ ft

b) $y = 10 \cos 36(6-2) + 15 \approx 6.91$ ft

c) $y = 10 \cos 36(9-2) + 15 \approx 11.91$ ft