

To find the equation given a graph you are going backwards from graphing.  
 You need to be able to find a, b, c, and d for the standard form:

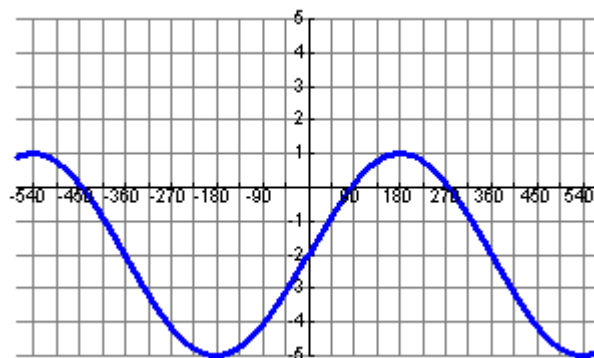
$$f(x) = a \sin b(x-c) + d \text{ or } f(x) = a \cos b(x-c) + d$$

To write the equation, you need to do the following:

1. Find the middle of the graph (sinusoidal axis)
2. Determine if you are looking for a sine curve or a cosine curve
3. Locate your starting point and ending point
4. Then, find each of the following:
  - a = \_\_\_\_\_ (need to know amplitude) -
  - b = \_\_\_\_\_ (need to know period) -
  - c = \_\_\_\_\_ (need to know starting point for x) -
  - d = \_\_\_\_\_ (need to know how the graph shifted from sinusoidal to x-axis)

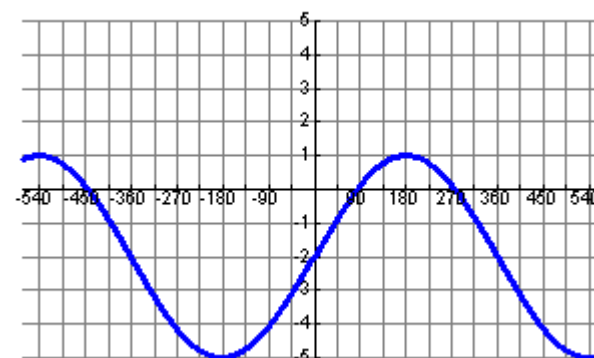
a.) Find a  $\sin(x)$  function:

- a - Amplitude:
- b - Period (end-start):
- c - HS (start):
- d - VS from x-axis:



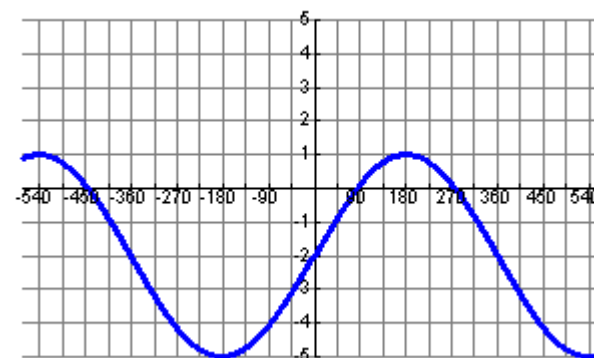
b.) Find a  $+\cos(x)$  function:

- a - Amplitude:
- b - Period (end-start):
- c - HS (start):
- d - VS from x-axis:



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

- a - Amplitude:
- b - Period (end-start):
- c - HS (start):
- d - VS from x-axis:

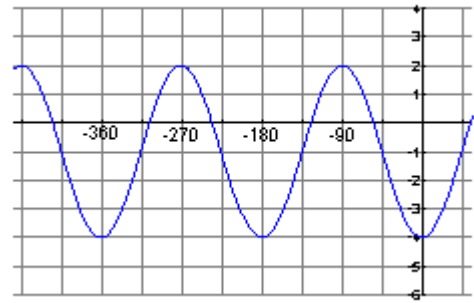


GPS PreCalculus: Graphing Trig  
Notes - for Writing Equations for sin/cos

Name \_\_\_\_\_

Example 2: Write the equation

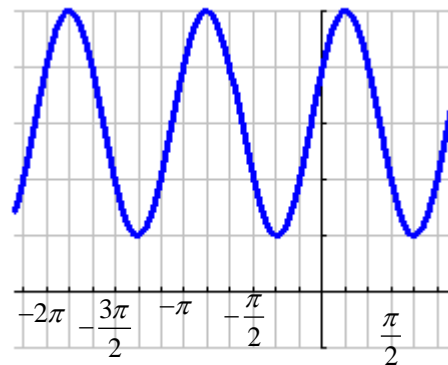
- a - Amplitude:
- b - Period (end-start):
- c - HS (start):
- d - VS from x-axis:



Example 2: Find a  $+\cos(x)$  function (radians)

- Amplitude (a):
- Period (b):

- HS (c):
- VS (d):



**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:  $t = 3, t = 6, t = 9$

