Trig 6.6

Model data using sine and cosine functions
Use sinusoidal functions to solve problems

period

amplitude

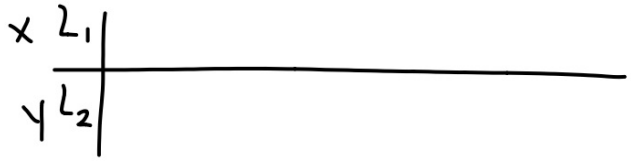
midline (vertical translation)

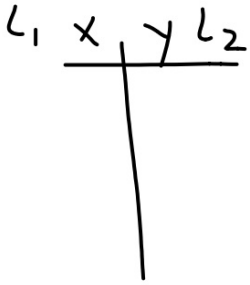
phase shift (horizontal translation)

sinusoidal

model

graphing calculators





Graphing calculator reminders:

Starting out:
2nd Quit <clear>
Y= <clear>
Statplots <off>
Stat>edit> clear lists

Check mode: Are you in degrees or radians? Could be either, but you need to know for window setting, etc.

Enter data:
Stat>edit

Graphing:
2nd Y= <Statplot>
on
scatterplot
L1, L2

Window
x min/max
ymin/max

6. **Meteorology** The average monthly temperatures for the city of Seattle, Washington, are given below.

(degrees of temp or...degrees/radians)

L_1	1	2	3								
	Jan.	**Feb.**	**March**	**April**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**
L_2	41°	44°	47°	50°	56°	61°	65°	66°	61°	54°	46°	42°

a. Find the amplitude of a sinusoidal function that models the monthly temperatures. 12.5

b. Find the vertical shift of a sinusoidal function that models the monthly temperatures. 53.5

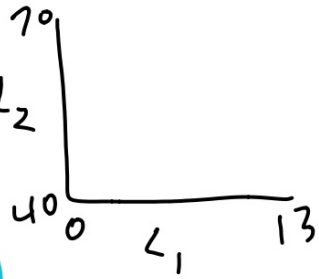
c. What is the period of a sinusoidal function that models the monthly temperatures? 12 mo

d. Write a sinusoidal function that models the monthly temperatures, using $t = 1$ to represent January.

e. According to your model, what is the average monthly temperature in February? How does this compare to the actual average?

f. According to your model, what is the average monthly temperature in October? How does this compare to the actual average?

Graph data
degrees or radians?
choose sine or cosine
centerline
amplitude
period
horizontal shift...?



$$y = 53.5 - 12.5\cos\left(\left(\frac{\pi}{6}\right)(x - 1.5)\right)$$

10

T = 41.4° Feb

56.7° Oct

$\frac{2\pi}{n} = \frac{4}{1}$ $\frac{4n}{4} = \frac{2\pi}{4}$ per = 4 sec.

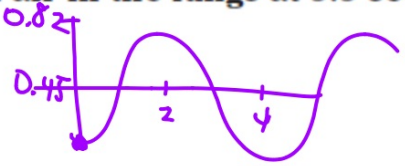
2 **HEALTH** An average seated adult breathes in and out every 4 seconds. The average minimum amount of air in the lungs is 0.08 liter, and the average maximum amount of air in the lungs is 0.82 liter. Suppose the lungs have a minimum amount of air at $t = 0$, where t is the time in seconds.

a. Write a function that models the amount of air in the lungs.

b. Graph the function.

c. Determine the amount of air in the lungs at 5.5 seconds.

$y = .45 - 0.37\cos\left(\frac{\pi}{2}t\right)$



choose sine or cosine
centerline
amplitude
period
horizontal shift?

period (trig) = wavelength (physics)

$$f = \frac{1}{per}$$