

Trig 6.6

~~Quiz 6.3 6.4~~

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

$$y = () + \sin (\theta -)$$

period 2π

amplitude 1

midline (vertical translation) 0

phase shift (horizontal translation) $-$

sinusoidal *sine-shaped* 

model

graphing calculators

Graphing calculator reminders:

Starting out:

2nd Quit <clear>

Y= <clear>

Statplots <off>

Stat>edit> clear lists

Enter data:

Stat>edit

Graphing:

2nd Y= <Statplot>

on

scatterplot

L1, L2

Window

x min/max

ymin/max

Check mode: Are you in degrees or radians?

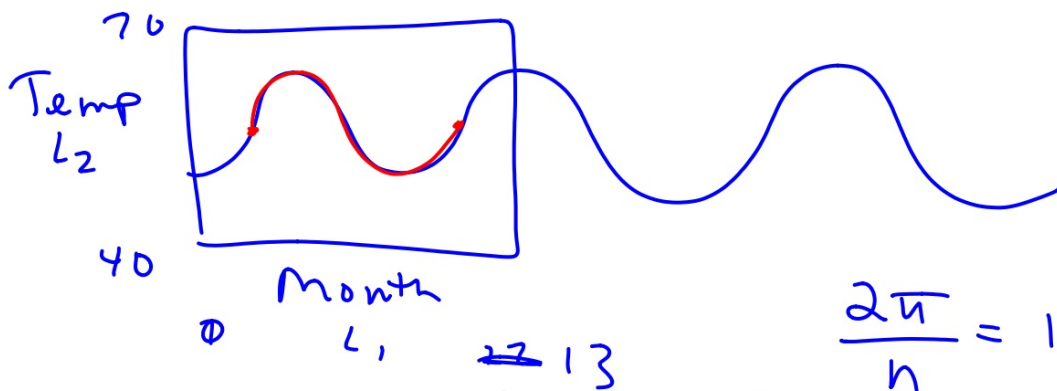
Could be either, but you need to know for window setting, etc.

6. **Meteorology** The average monthly temperatures for the city of Seattle, Washington, are given below. (degrees of temp...degrees/radians)

	1	2	3	4	5	6	7	8	9	10	11	12
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
L ₁	41°	44°	47°	50°	56°	61°	65°	66°	61°	54°	46°	42°
L ₂												

- Find the amplitude of a sinusoidal function that models the monthly temperatures. 12.5
- Find the vertical shift of a sinusoidal function that models the monthly temperatures. 53.5
- What is the period of a sinusoidal function that models the monthly temperatures? 12
- Write a sinusoidal function that models the monthly temperatures, using $t = 1$ to represent January.
- According to your model, what is the average monthly temperature in February? How does this compare to the actual average?
- 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...?



$$y = 53.5 + 12.5 \sin\left(\frac{\pi}{6}(x - 44)\right)$$

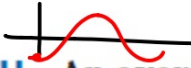
$$y = 41.6^\circ$$

$$y = 56.1^\circ$$

$$\frac{2\pi}{n} = 12$$

$$\frac{12n}{12} = \frac{2\pi}{12}$$

$$n = \frac{12 \times 6}{6}$$



per = 4

2

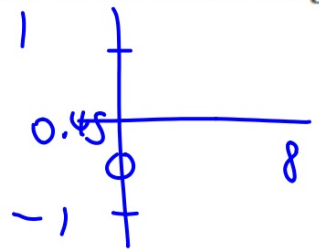
HEALTH An average seated adult breathes in and out every 4 seconds. The average minimum amount of air in the lungs is 0.08 liter, and the average maximum amount of air in the lungs is 0.82 liter. Suppose the lungs have a minimum amount of air at $t = 0$, where t is the time in seconds.

$y = 0.45$

- 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.

$y = 0.45 - 0.37 \cos\left(\frac{\pi}{2} x\right)$

$\frac{2\pi}{n} = 4$
 $\frac{4n}{4} = \frac{2\pi}{4}$



5.5

choose sine or cosine
 centerline
 amplitude
 period
 horizontal shift?

period (trig) = wavelength (physics)