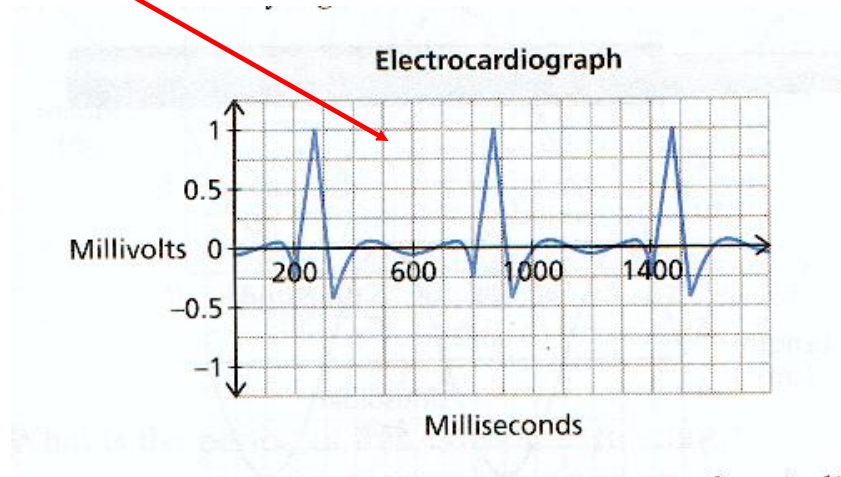


Sinusoidal Relations

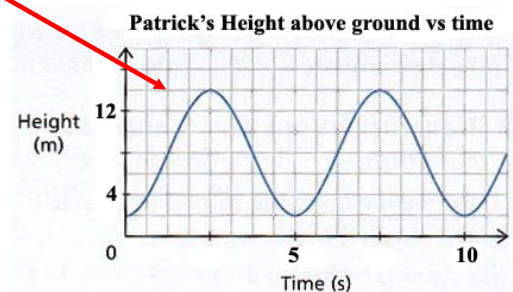
Periodic Function: A function for which the dependent variable takes on the same set of values over and over again as the independent variable changes.

Example of periodic behavior

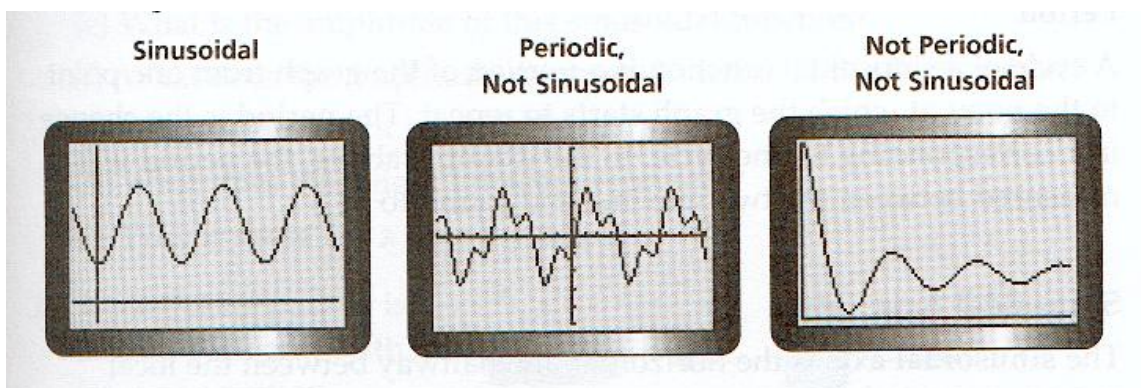


Sinusoidal Function: A periodic function that looks like waves, where any portion of the curve can be translated onto another portion of the curve.

Example of sinusoidal behavior



These illustrations should summarize periodic and sinusoidal...



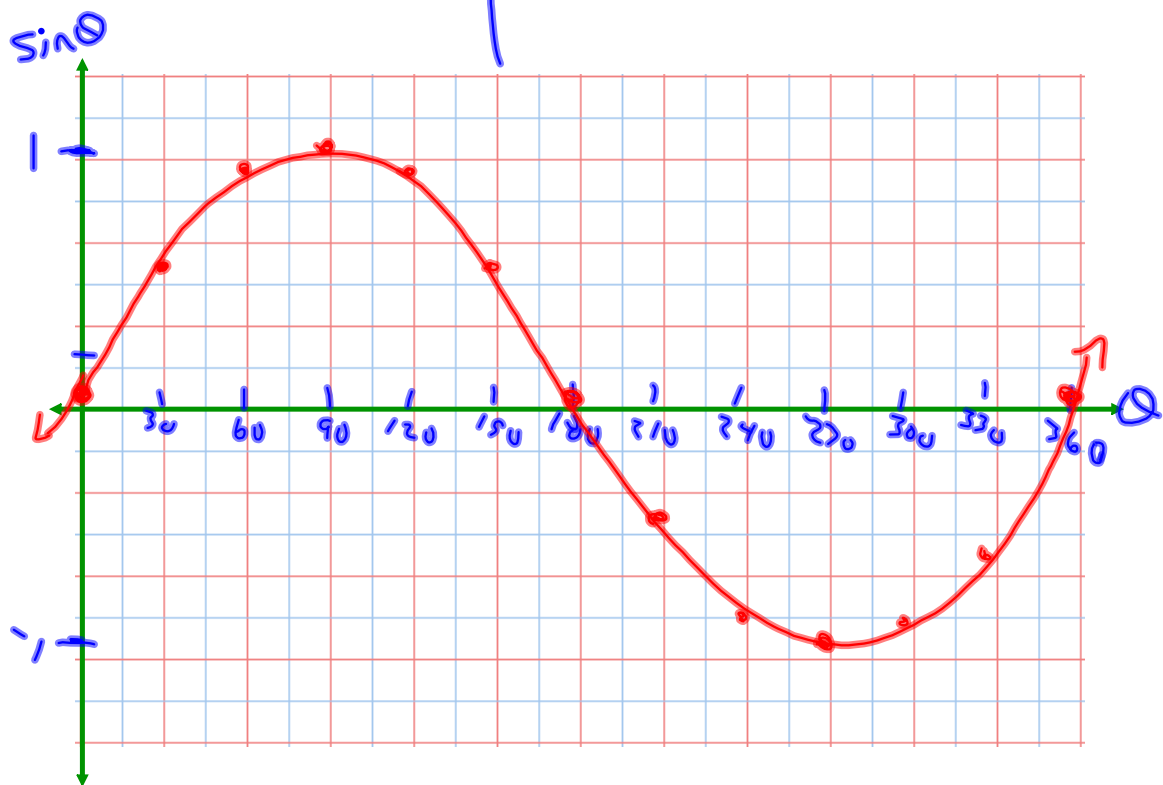
Let's examine the graph of $y = \sin \theta$

$$\frac{1}{2} = 0.5$$

$$\frac{\sqrt{3}}{2} = 0.86$$

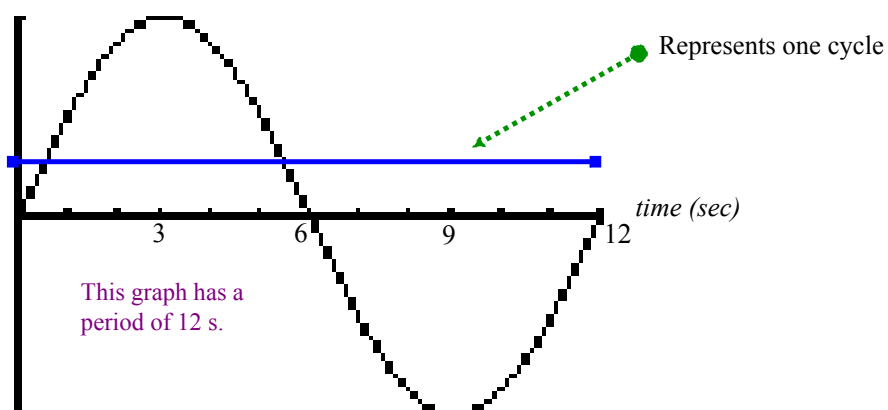
θ	0	30	60	90	120	150	180	210	240	270	300	330	360
y	0	0.5	0.86	1	0.86	0.5	0	-0.5	-0.86	-1	-0.86	-0.5	0

Now plot the above points...

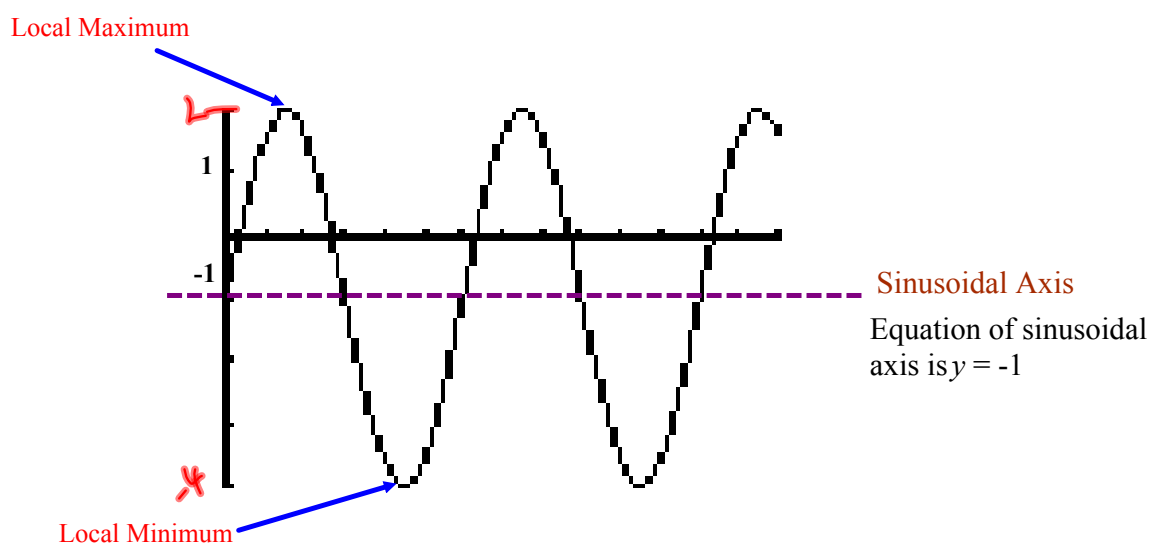


Vocabulary of Sinusoidal Functions

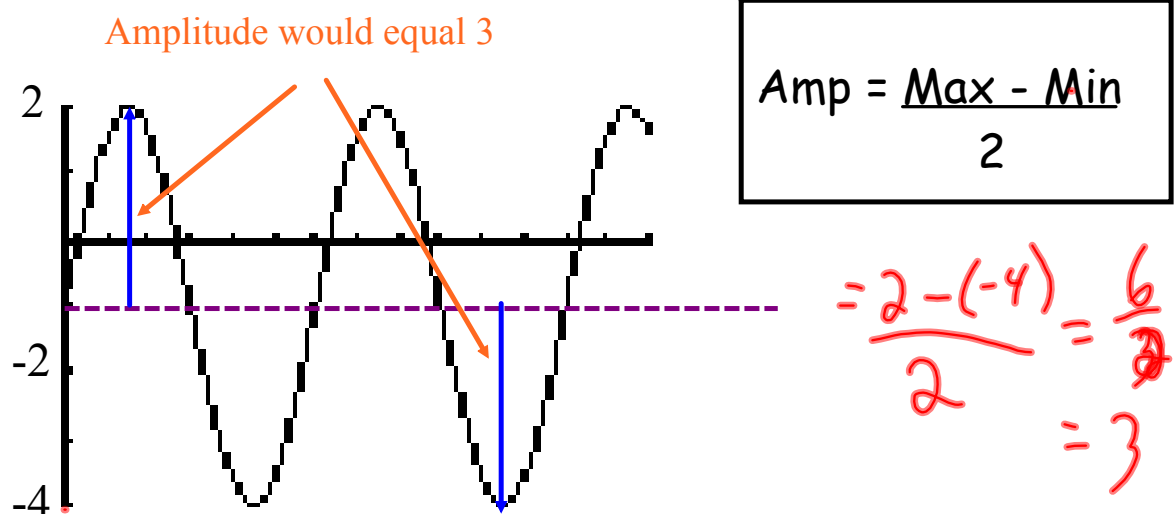
I. Period: The change in x corresponding to one cycle.



II. Sinusoidal Axis: The horizontal line halfway between the local maximum and local minimum.

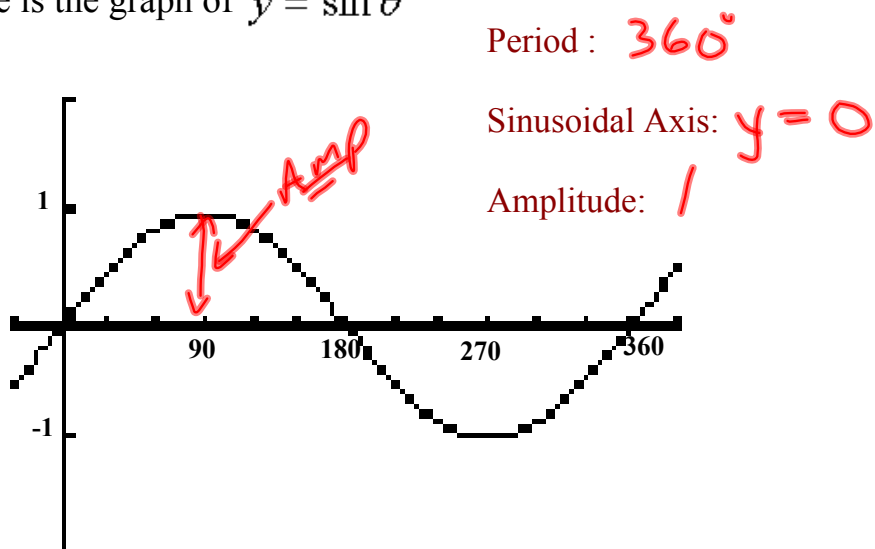


III. Amplitude: The vertical distance from the sinusoidal axis to a local maximum or local minimum.



Summarize...

Here is the graph of $y = \sin \theta$

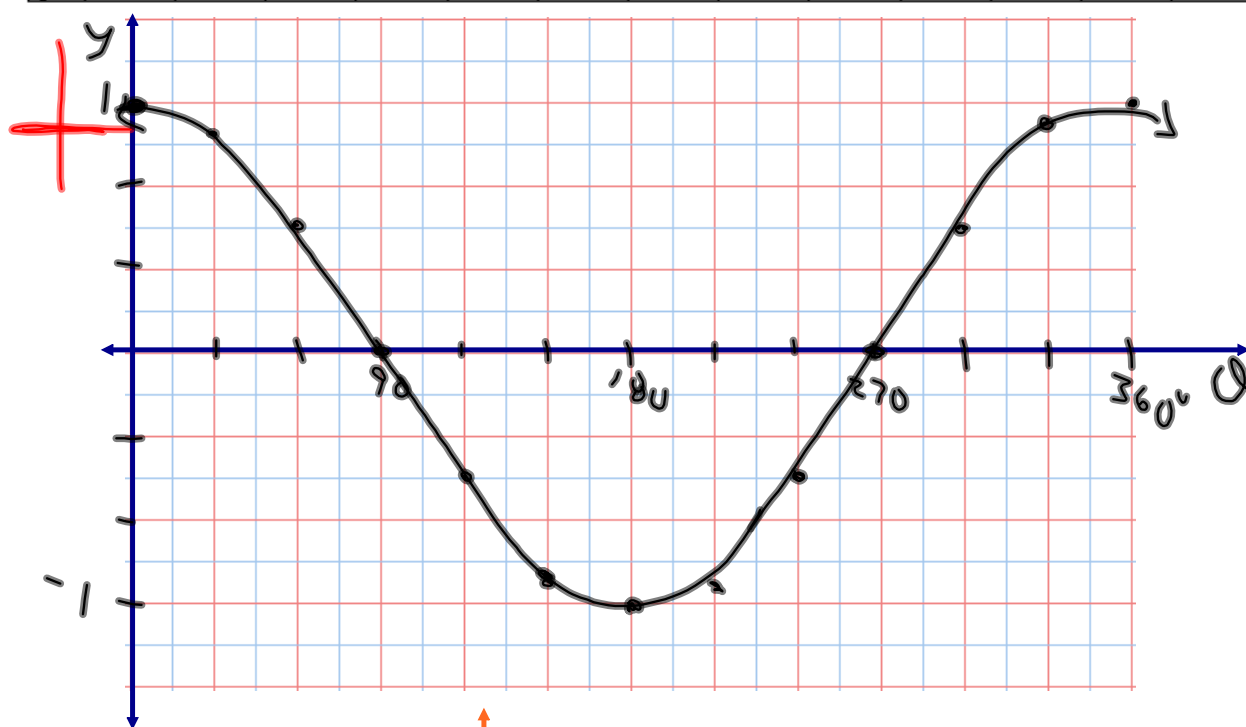


What about $y = \cos \theta$?

Complete the table of values and sketch below

$y = \cos \theta$

θ	θ	30	60	90	120	150	180	210	240	270	300	330	360
y		0.9	0.5	0	-0.5	-0.9	-1	-0.9	-0.5	0	0.5	0.9	1



Is this a sinusoidal function?

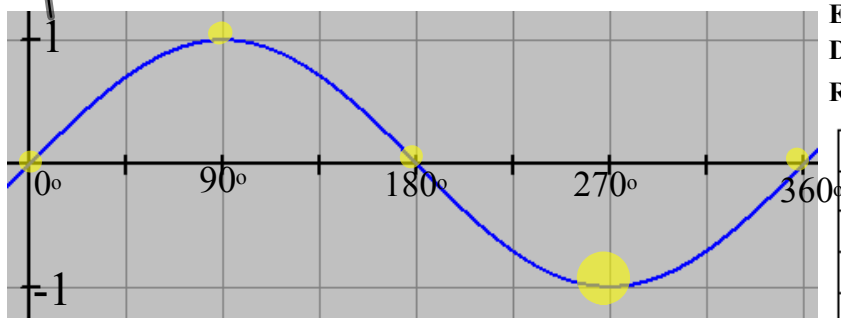
What about the period, sinusoidal axis, and amplitude?

Basic Trig Graphs

Handwritten symbol



$$y = \sin \theta$$

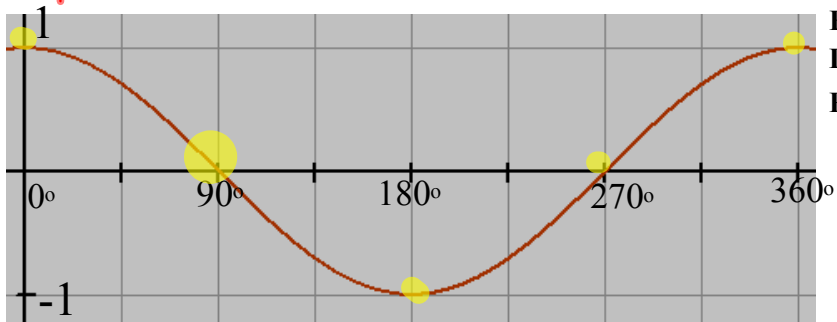


Period = 360°
 Amplitude = 1
 Eq'n of Sinusoidal Axis: $y = 0$
 Domain: $\{\theta \in \mathbb{R}\}$
 Range: $\{-1 \leq y \leq 1\}$

θ	y
0°	0
90°	1
180°	0
270°	-1
360°	0

Handwritten symbol

$$y = \cos \theta$$

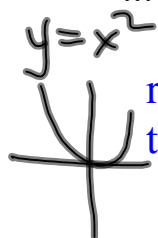


Period = 360°
 Amplitude = 1
 Eq'n of Sinusoidal Axis: $y = 0$
 Domain: $\{\theta \in \mathbb{R}\}$
 Range: $\{-1 \leq y \leq 1\}$

θ	y
0°	1
90°	0
180°	-1
270°	0
360°	1

Transformations of the Sinusoidal Function

Recall...



reflection in
the x-axis

$$y = -2(x-3)^2 + 4$$

vertical
stretch
factor

horizontal
translation

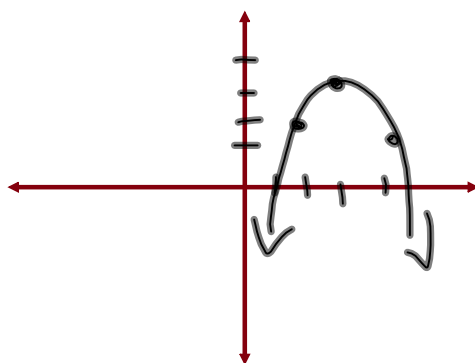
vertical
translation

Vertex $\Rightarrow (3, 4)$

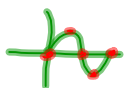
~~Stretch~~

~~Sketch~~ $\Rightarrow 2$

Down



Now, let's look at a sinusoidal function...



$$y = -2 \sin[3(\theta - 60^\circ)] - 1$$

RST

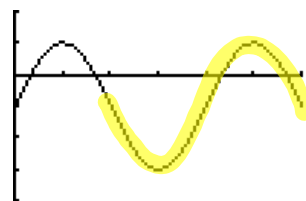
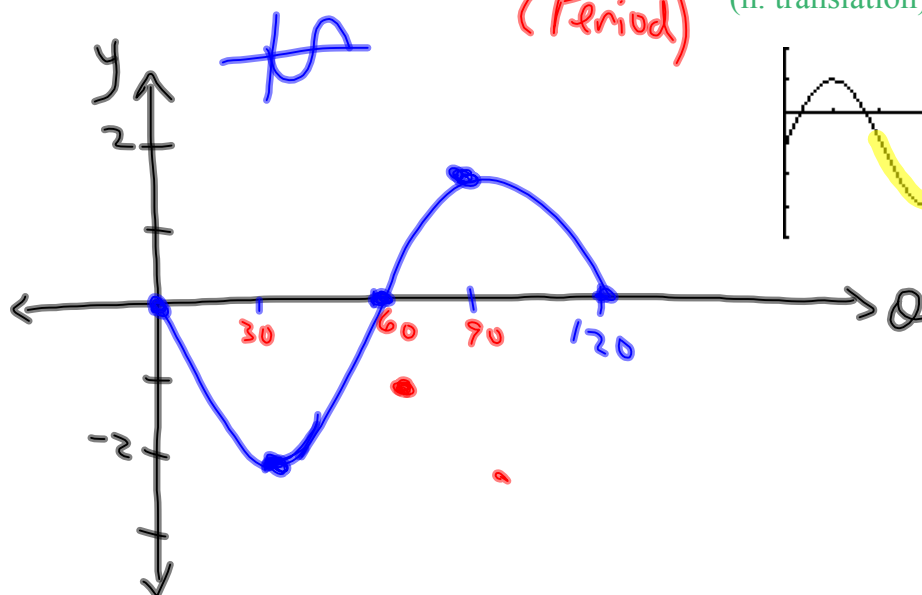
Reflection

Amplitude
(v. stretch)

Horizontal
Stretch
(Period)

Phase
Shift
(h. translation)

Vertical
Translation



Attachments

Text Solns - Page 111 #14_15.doc

Text Solns - Page 115 #25_26.doc