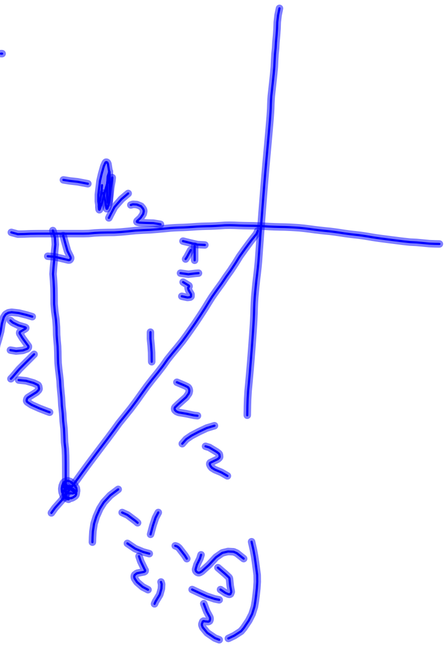
3. $\theta = \frac{a}{r}$

$4 = \frac{a}{3}$

$a = \underline{12cm} + 3cm + 3cm$

$= \underline{18cm}$

2.



5.

$\theta = \frac{a}{r}$

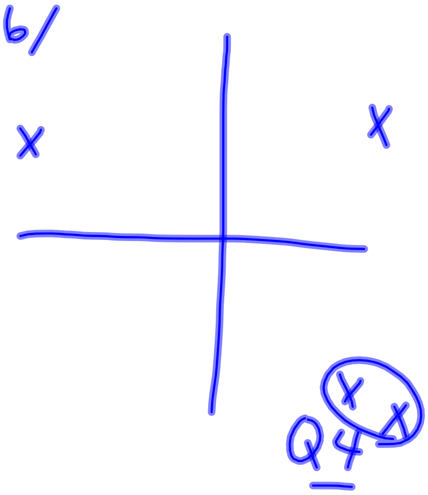
$1.5Rad = \frac{a}{2m}$

$a = \underline{3m}$

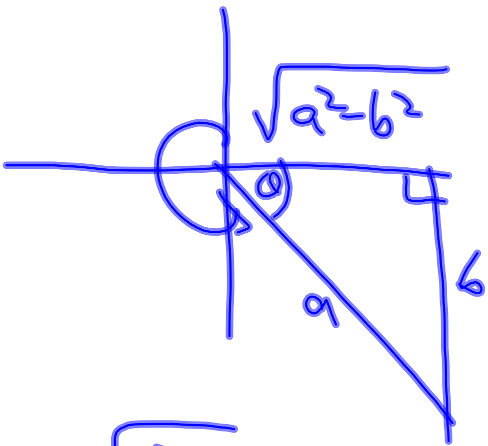
$\theta = \frac{1.5Rad}{\pi} \times 180$

$= \underline{15Rad}$

#6/



$\csc\theta = \frac{a}{b}$



$\cos\theta = \frac{\sqrt{a^2-b^2}}{a}$

#1/ $\frac{-20}{-3\sqrt{3}+2} \overset{\text{or}}{=} \frac{60\sqrt{3}+40}{23}$

2/ $\theta = \frac{a}{r}$ Must be in Radians

$\frac{74\pi}{180} = \frac{15}{r}$

$r = 11.6\text{ cm}$

$A_{seg} = \left(\frac{74^\circ}{360^\circ}\right)\pi(11.6)^2 - \frac{1}{2}(11.6)(11.6)\sin 74^\circ$

$= 22.2\text{ cm}^2$

3.

a) $r = \frac{3.66}{2} = 1.83\text{ m}$

, $5.61\frac{\text{km}}{\text{h}} \times \frac{10^3\text{ m}}{1\text{ km}} \times \frac{1\text{ h}}{3600\text{ s}}$

$= 1.56\frac{\text{m}}{\text{s}}$

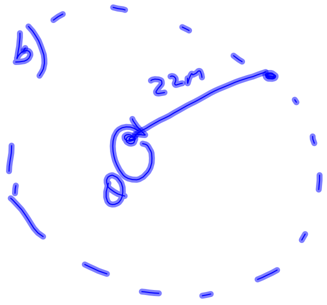
$\theta = \frac{1.56\text{ m}}{1.83\text{ m}}$

$\theta = 0.852\text{ Rad}$

$V_A = \frac{0.852\text{ Rad}}{1\text{ sec}}$

$= 0.852\text{ Rad/sec}$

b)



8 Rev every 43 sec.

$V_A = \frac{8(2\pi)\text{ Rad}}{43\text{ sec}}$

$V_A = 1.169\text{ Rad/sec}$

∴ After 3 min. (180 sec) $\theta = 1.169\frac{\text{Rad}}{\text{s}} \times 180\text{ s}$

$= 210.414\text{ Rad}$

$210.414\text{ Rad} = \frac{a}{22\text{ m}}$

$a = 4629.10\text{ m}$

$r(21) = 2500 + 1500\cos\left(\frac{\pi(21)}{6}\right) = 0$

$= 2500$

$\left(\frac{7\pi}{2}\right)$

5. a) 60, 120

420, 480

-300, -240

b) $x = \pm\frac{\pi}{2}$

$\pm\frac{3\pi}{2}$

6. a) $\theta = 37, 143, 397, 503$

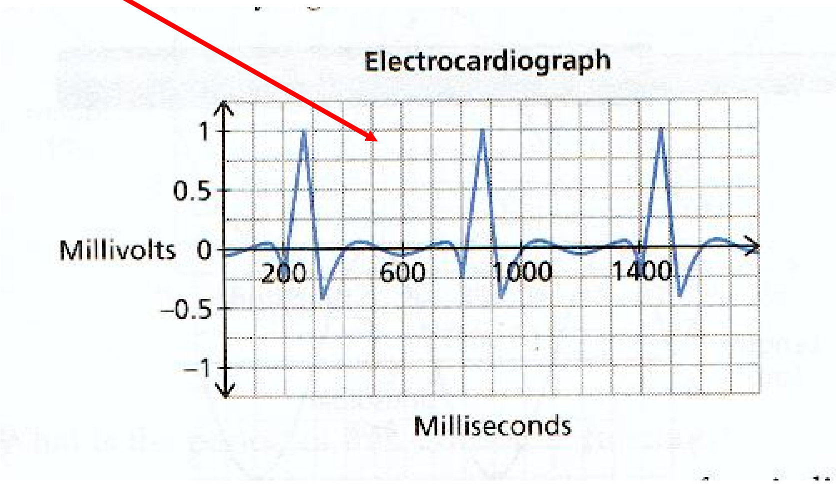
$-323, -217$

b) $0, \frac{\pi}{2}, \frac{3\pi}{2}, 2\pi, \frac{5\pi}{2}, \frac{7\pi}{2}, 4\pi$

Sinusoidal Relations

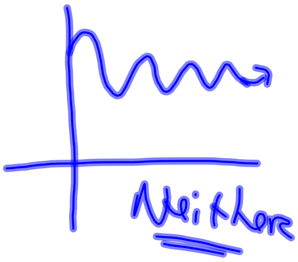
Periodic Function: A function for which the dependent variable takes on the same set of values over and over again as the independent variable changes.

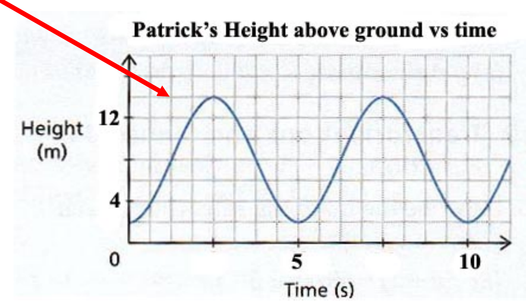
Example of periodic behavior



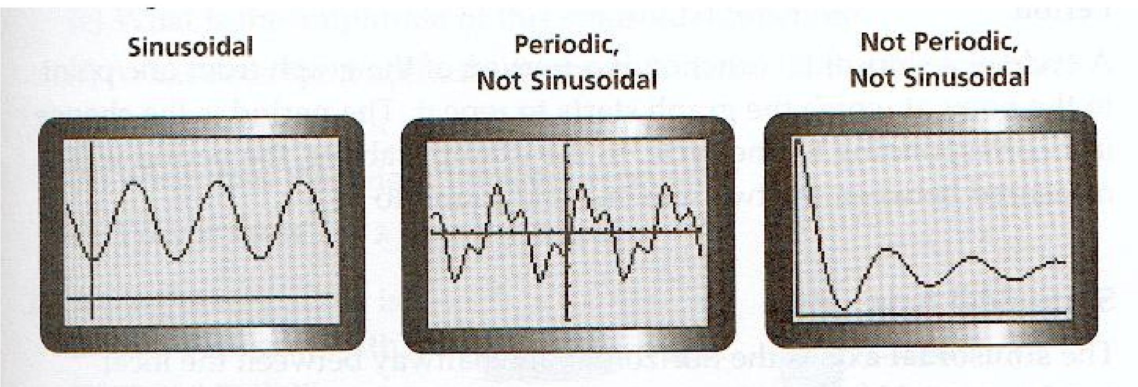
Sinusoidal Function: A periodic function that looks like waves, where any portion of the curve can be translated onto another portion of the curve.

Example of sinusoidal behavior





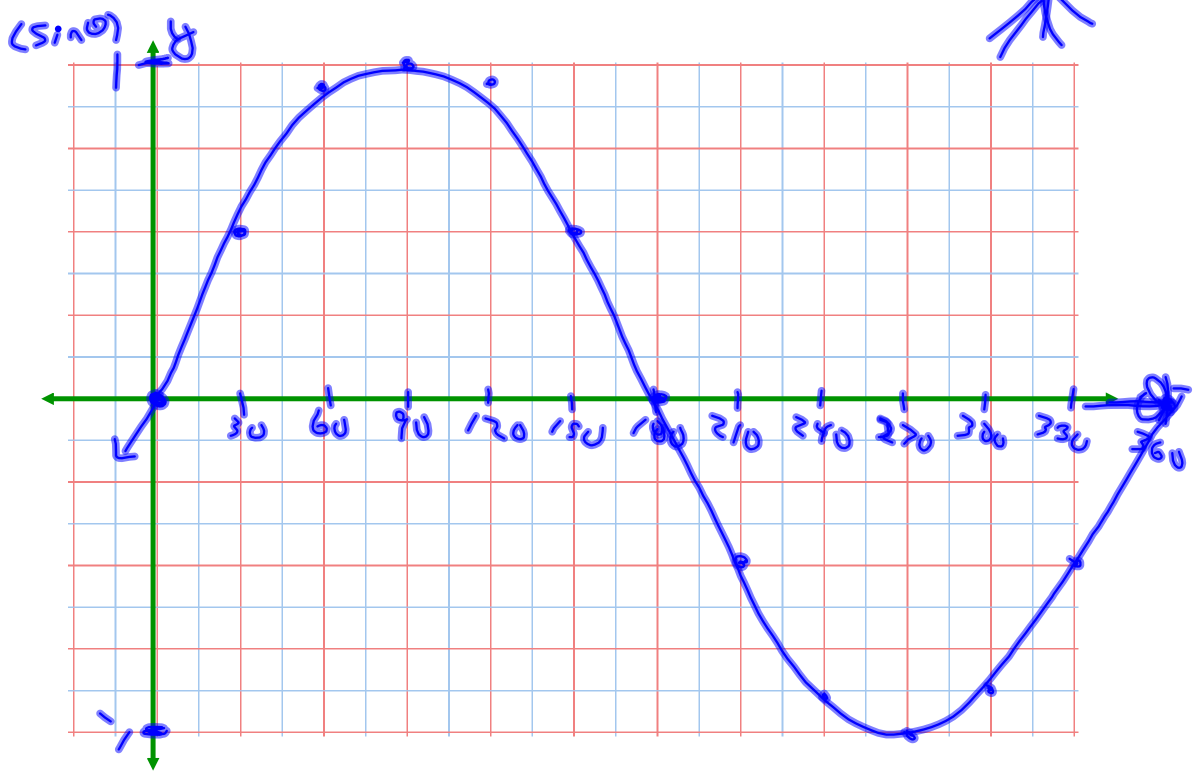
These illustrations should summarize periodic and sinusoidal...



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

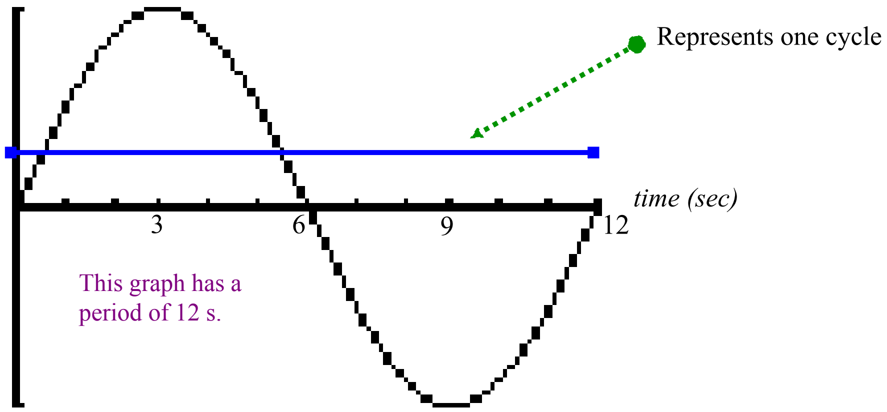
θ	0	30	60	90	120	150	180	210	240	270	300	330	360
y	0	0.5	0.9	1	0.9	0.5	0	-0.5	-0.9	-1	-0.9	-0.5	0

Now plot the above points...



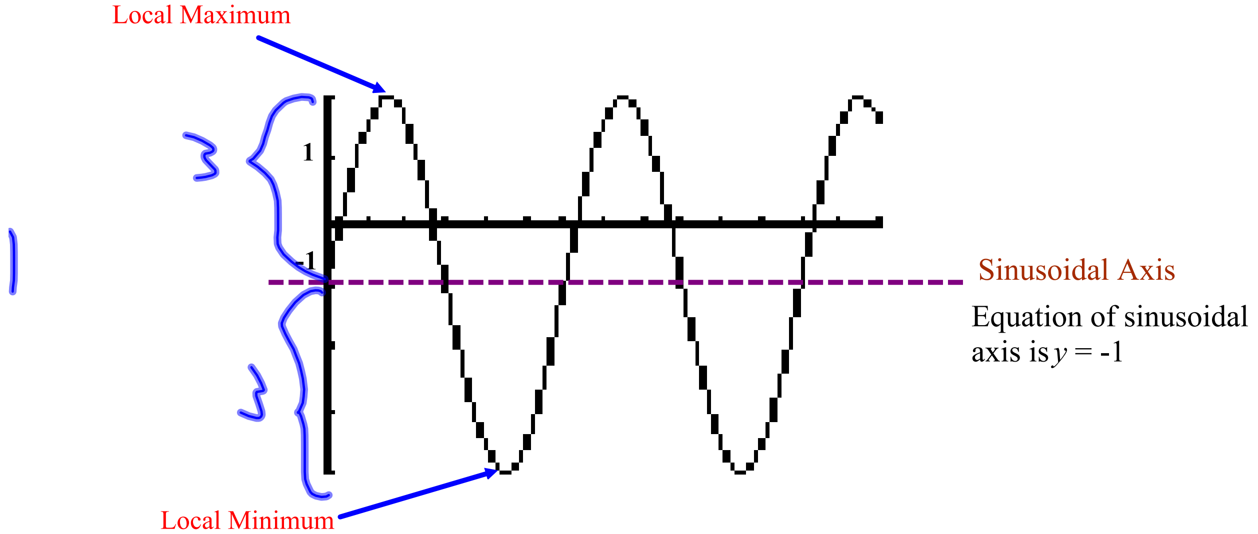
Vocabulary of Sinusoidal Functions

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



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

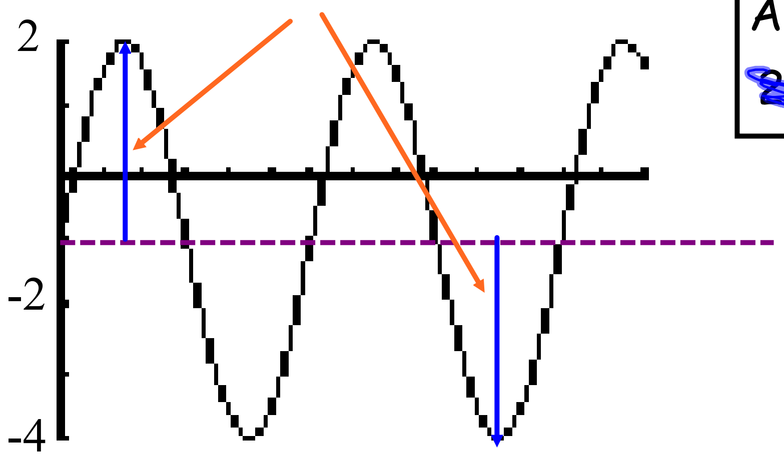
(highest point) (lowest point)



III. Amplitude:

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

Amplitude would equal 3

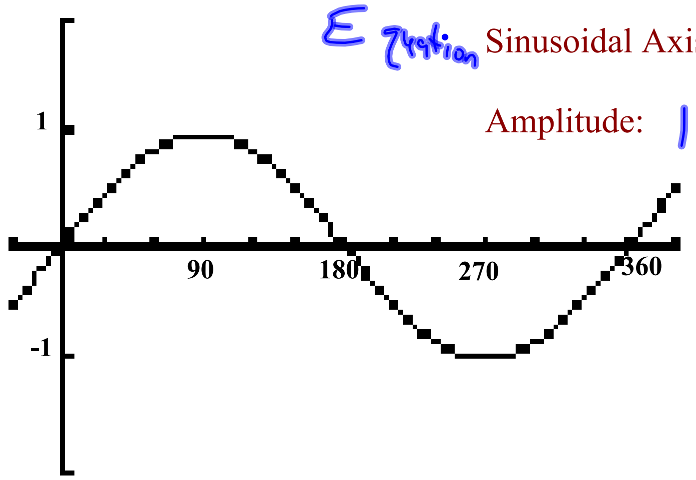


$$\text{Amp} = \frac{\text{Max} - \text{Min}}{2}$$

$$\frac{2-(-4)}{2} = \frac{6}{2} = \underline{\underline{3}}$$

Summarize...

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



Period : 360°

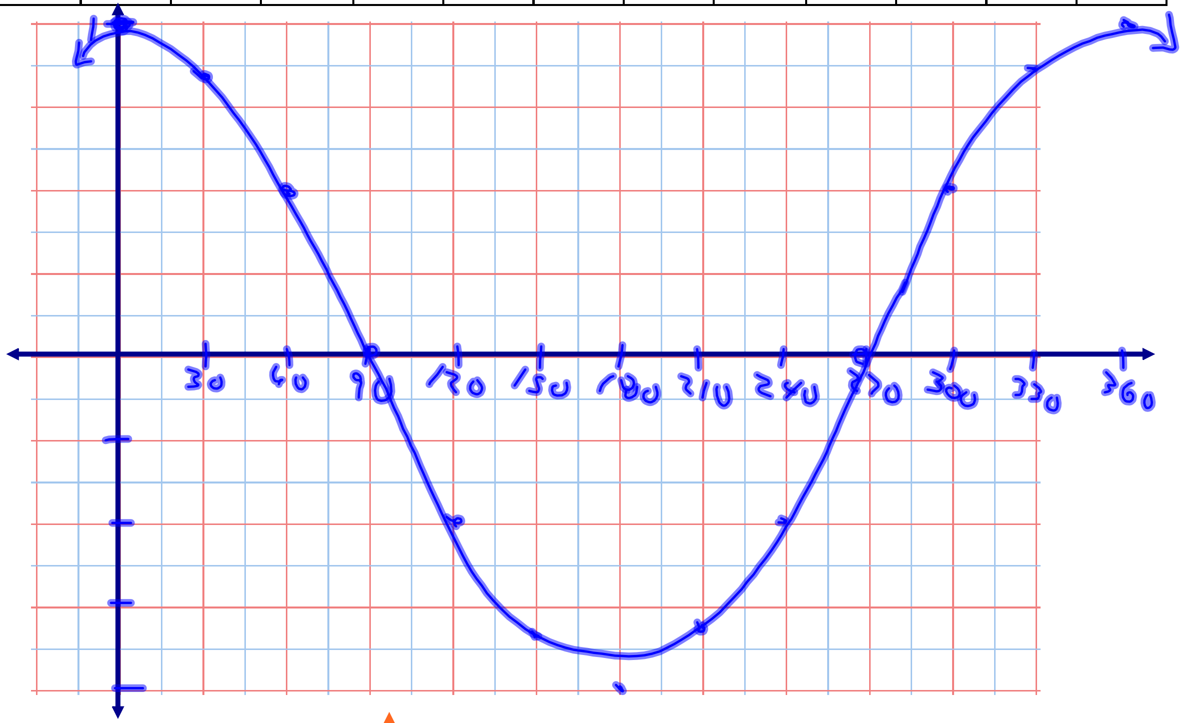
Equation Sinusoidal Axis: $y = 0$

Amplitude: 1

What about $y = \cos\theta$?

Complete the table of values and sketch below

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

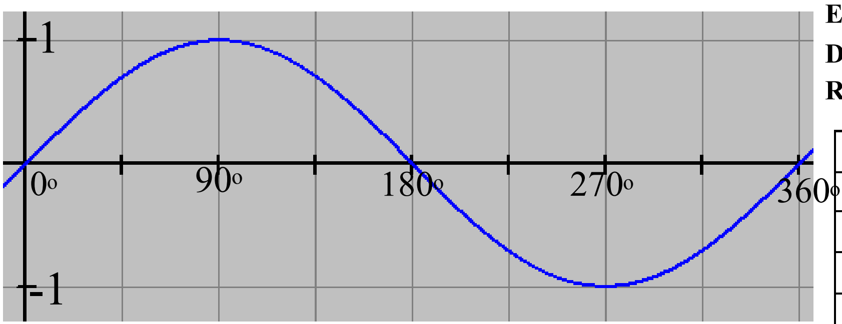


Is this a sinusoidal function?

What about the period, sinusoidal axis, and amplitude?

Basic Trig Graphs

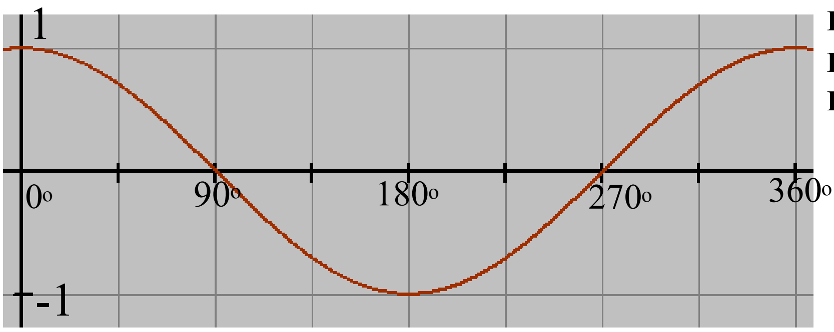
y = sin θ



Period = 360°
Amplitude = 1
Eq'n of Sinusoidal Axis: y = 0
Domain: {θ ∈ R }
Range: { -1 ≤ y ≤ 1 }

θ	y
0°	0
90°	1
180°	0
270°	−1
360°	0

y = cos θ



Period = 360°
Amplitude = 1
Eq'n of Sinusoidal Axis: y = 0
Domain: {θ ∈ R }
Range: { -1 ≤ y ≤ 1 }

θ	y
0°	1
90°	0
180°	−1
270°	0
360°	1