Arroyo P.6 5/6/22

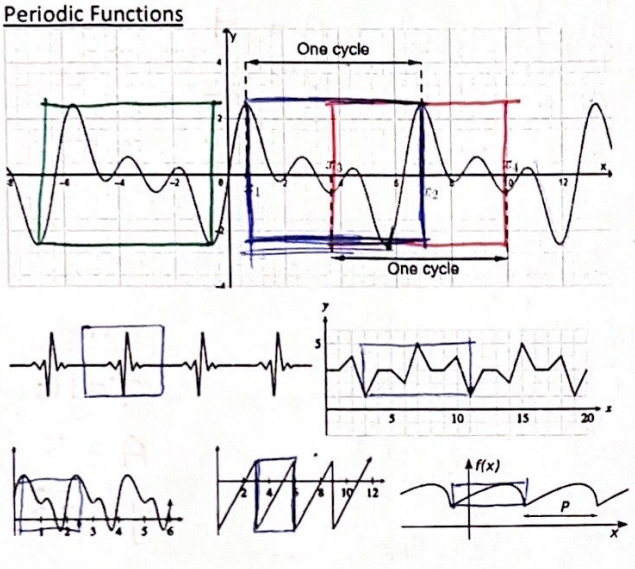
A70: pg. 539 #1-6

Notes: 34.1 Periodic Functions

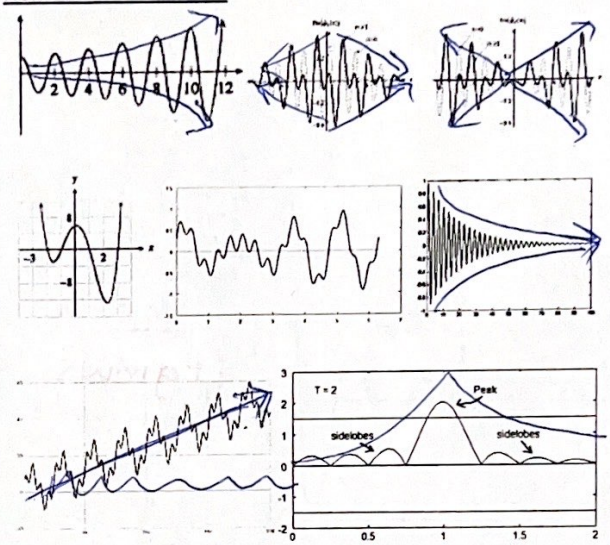
Periodic Functions:

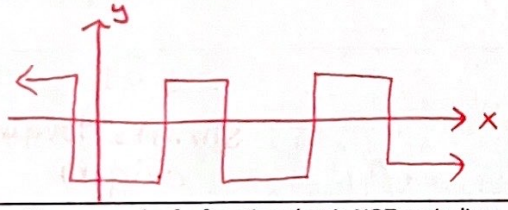
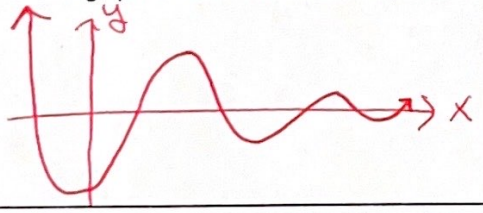
A periodic function has a graph that repeats itself exactly/perfectly in regular intervals called periods. Another way to think about it is that you can copy one section and paste it over and over again to get the graph.

Periodic Functions



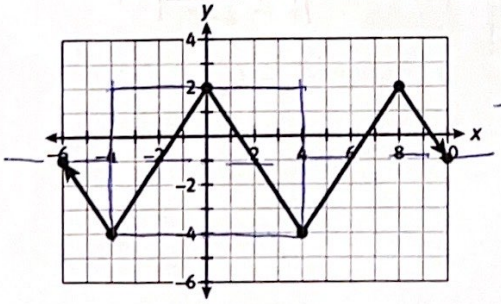
Non Periodic Functions



1. Draw a graph of a periodic function. 	2. Why is the graph in #1 periodic? It repeats itself exactly with the same pattern.
3. Draw a graph of a function that is NOT periodic. 	4. Why is the graph in #3 not periodic? It doesn't repeat itself exactly.

Period, Amplitude, and Midline:

- The period is the **HORIZONTAL** distance required for the graph to complete one cycle, one repetition, or the minimum pattern needed to repeat itself. WIDTH
- The amplitude is **HALF** of the **HEIGHT**, or **HALF** of the **VERTICAL** distance. ← always positive
- The midline is a reference **LINE** that the splits the graph in half **HORIZONTALLY**.



Period

$T = 8$

Amplitude

$A = \frac{6}{2}$

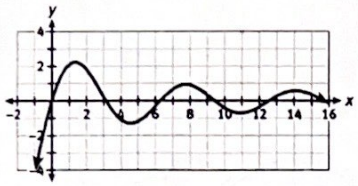
$A = 3$

Midline

$y = -1$

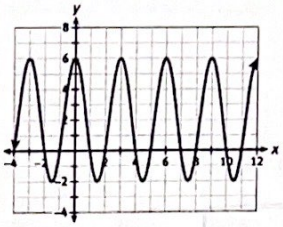
Determine if the following graphs are periodic. If they are periodic state the period, amplitude, and midline. If they are not periodic explain why they are not periodic.

5.



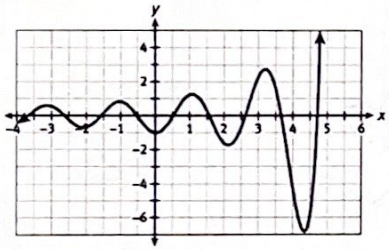
NOT
it shrinks

6.



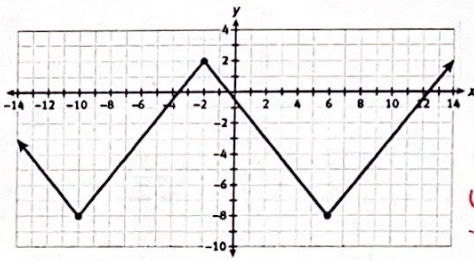
Periodic
T = 3
A = 4
y = 2

7.



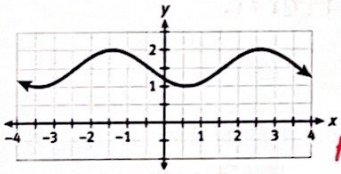
NOT
it grows

8.



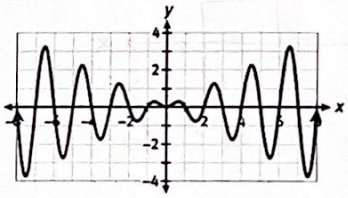
Periodic
T = 16
A = 5
y = -3

9.



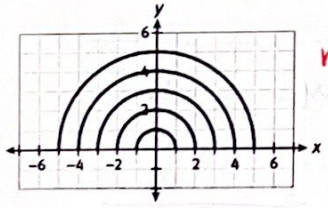
Periodic
T = 4
A = $\frac{1}{2}$
y = 1.5

10.



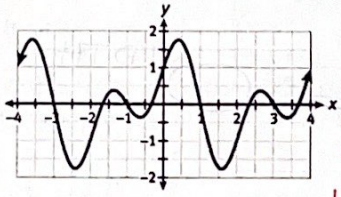
NOT
shrinks towards origin

11.



NOT
not a function

12.



Periodic
T = 4
A = 2.75
y = 0

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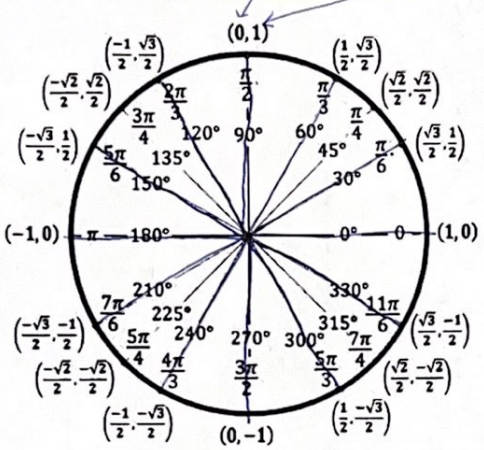
A71: Amplitude and Period with Sine

Notes: 34.2 Sine Graph

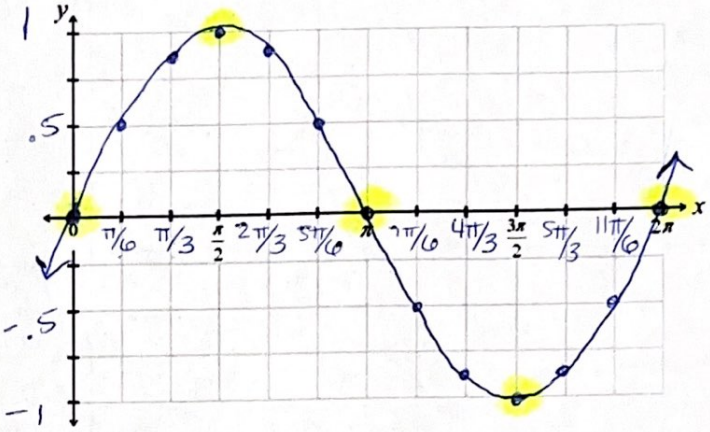
"Unwrapping" Sine from the Unit Circle:

On the Unit Circle: $x = \cos\theta$ & $y = \sin\theta$



★ $\sqrt{3}/2 = 0.86$

On the Sine Graph: $x = \theta$ from Unit Circle & $y = \sin\theta$ from Unit Circle



Period: $T = 2\pi$ Amplitude: $A = 1$ Midline: $y = 0$

Key Points for Sine: $(0,0)$ $(\frac{\pi}{2},1)$ $(\pi,0)$ $(\frac{3\pi}{2},-1)$ $(2\pi,0)$

Amplitude Changes (Vertical stretch and shrink):

- $y = A\sin(x)$
- The distance from the midline to the top (or midline to the bottom) is A OR multiply the y-values by A

Identify the period, amplitude, and midline, then graph. Identify the domain and range.

1. $y = 3\sin x$

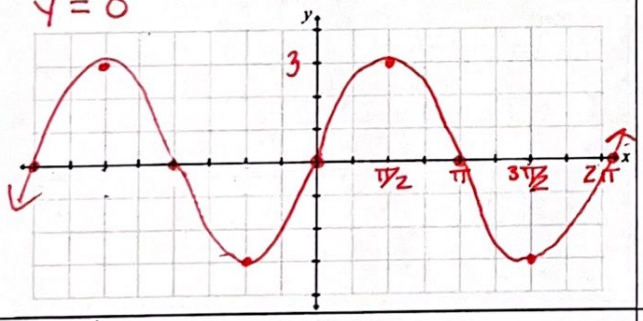
$T = 2\pi$

$A = 3$

$y = 0$

D: $(-\infty, \infty)$

R: $[-3, 3]$



2. $y = -2\sin x$

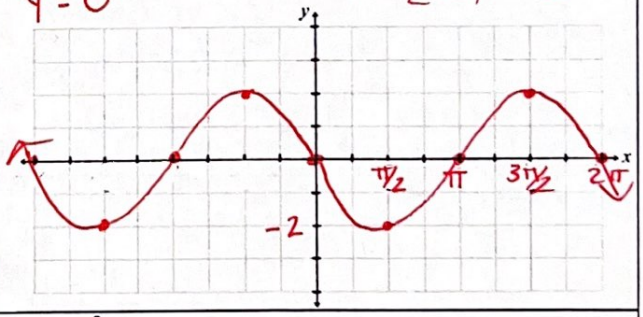
$T = 2\pi$

$A = 2$

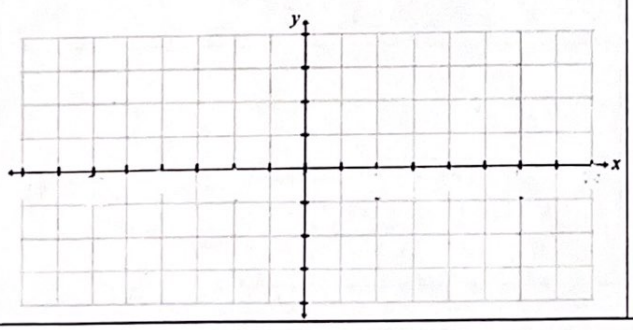
$y = 0$

D: $(-\infty, \infty)$

R: $[-2, 2]$



3. $y = \frac{1}{2}\sin x$



4. $y = \frac{3}{2}\sin x$