Section 13-1: Periodic Functions

A repeating pattern of y-values at regular intervals.

What you should be able to do after this section:

- Tell if a function is periodic or not.
- Find the following of periodic functions:
  - Period
  - Amplitude
  - Equation of the Midline(Axis)

Alg 2 Hwk #5 Sec 13-1

Periodic function: A repeating pattern of y-values at regular intervals.

Terms used when discussing periodic functions:

Cycle: the smallest portion of the graph that can be repeated to create the entire graph.

Period: The width of one cycle (x-values)

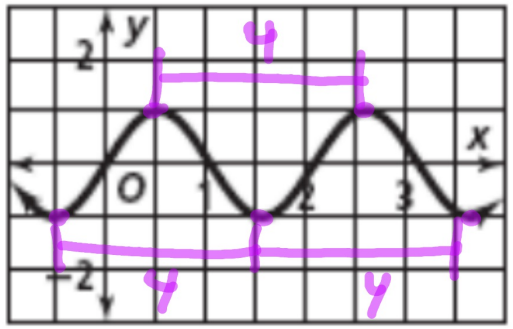
Axis (also called the Midline):
The horizontal line that passes through the middle of the graph.

$y =$

Amplitude:
The vertical distance from the midline to either the maximum or the minimum. (y-values)

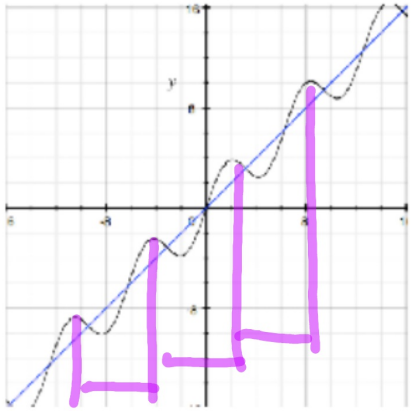
1. Is each of the below a periodic function? If no, explain why.

A



Yes

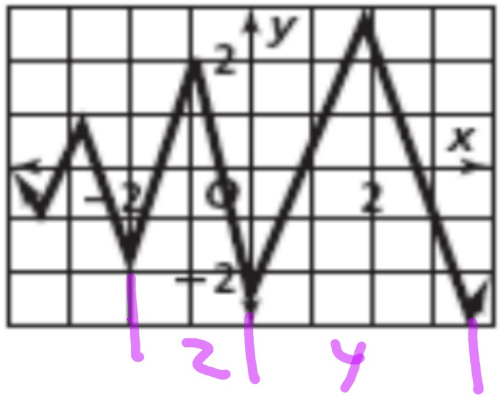
B



NO

even though max's and min's occur at regular intervals the y-values don't repeat.

C



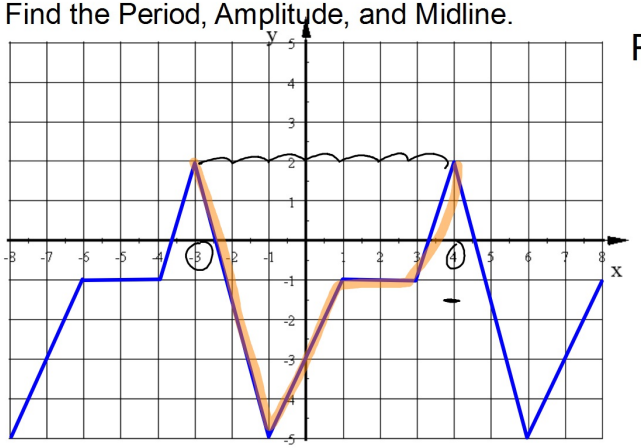
No, y-values don't repeat and mins and max's don't occur at regular intervals.

If you can't tell by looking at the graph, this is how you find the Midline and Amplitude mathematically.

Midline (Axis): $y = \frac{Max + Min}{2}$

Amplitude = $\frac{Max - Min}{2}$ = half the total height

Find the Period, Amplitude, and Midline.



Period = $4 - -3 = 7$

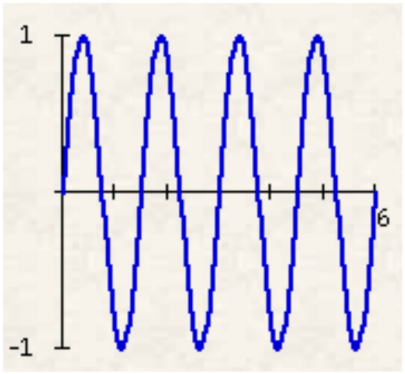
Amp = $\frac{7}{2} = 3.5$

$\frac{2 - -5}{2} = \frac{7}{2}$

Midline:

$\frac{2 + -5}{2} = y = -1.5$

4. What is the period of each function?

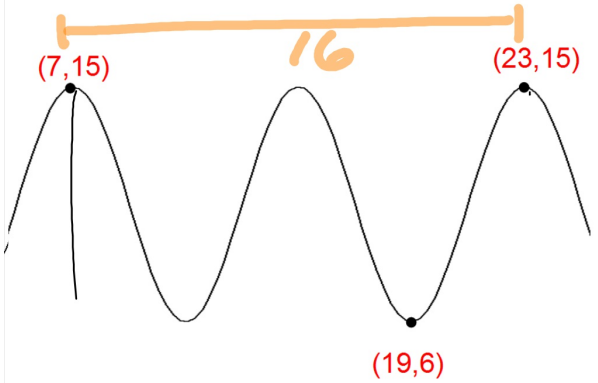


Period = 1.5 units

four cycles exist from 0 to 6:

$\frac{6}{4} = 1.5$

Find the amplitude, period, and equation of the midline.



Period = $\frac{16}{2} = 8$

Amplitude = $\frac{15-6}{2} = \frac{9}{2}$ 4.5

Eq of Midline : $y = \frac{15+6}{2} = 10.5$

Suppose f is a periodic function with a period of 10

y-values repeat every 10 units.

Given f(12)=23 and f(31) = 2

(12,23)

Find f(32) = 23

This is two periods (20 units) to the right of f(12)=23

Find f(21) = 2

This is one period (10 units) to the left of f(31)=2

What is the measure of an angle?

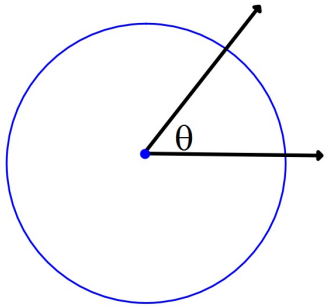
The size of an angle
or
The amount of turn to move from one side the other side.

Units used to measure anlges:

- Degrees
- Radians

Central Angle:

An angle whose vertex is at the center of a circle.



θ Greek letter Theta

Other common variables used for angles:

α alpha

β beta

γ gamma

Variable often used to represent an angle

Sinθ