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

Cycle: One complete pattern.
The smallest portion of the function that could be translated left and right to create the entire function.

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

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

$y = \#$

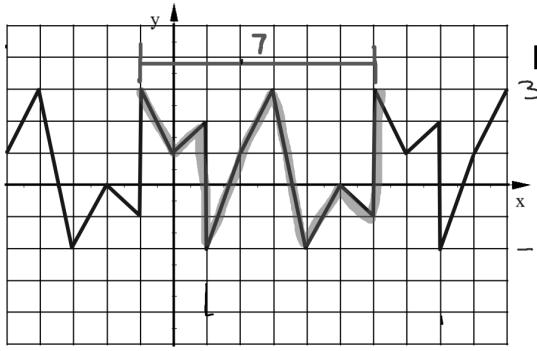
Amplitude:
The vertical distance from the midline to either the maximum or the minimum. y-values
OR
Half the total height of the periodic function

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

1. Find the Period, Amplitude, and Equation of the Midline for the periodic function shown below.



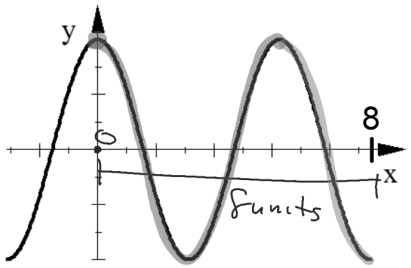
Period = 7

Eq of Midline: $y = \frac{3 + -2}{2} = \frac{1}{2}$

Amplitude = $\frac{3 - -2}{2} = 2.5$

2. Find the period of each periodic function.

a) Period =



$\text{period} = \frac{8 \text{ units}}{\#\text{ cycles}}$

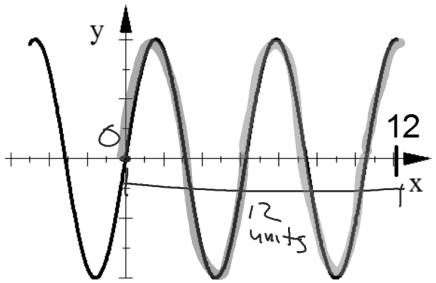
$\frac{8}{1\frac{1}{2}} = \frac{8}{\frac{3}{2}}$

$= 8 \cdot \frac{2}{3}$

Period $= \frac{16}{3}$

2. Find the period of each periodic function.

b) Period =



$\text{period} = \frac{12 \text{ units}}{2\frac{1}{4} \text{ cycles}}$

$= \frac{12}{\frac{9}{4}}$

$= 12 \cdot \frac{4}{9_3}$

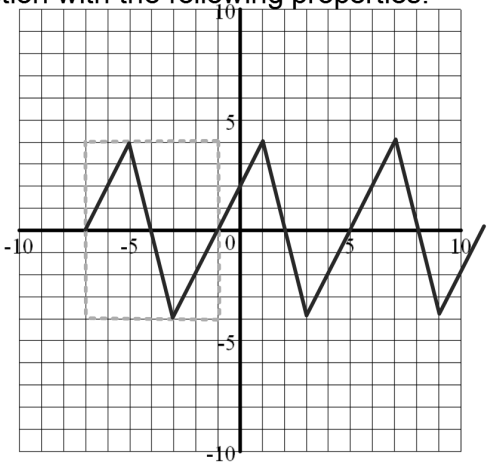
period $= \frac{16}{3}$

Draw a periodic function with the following properties:

Period = 6
Amplitude = 4

this means the cycle should be 6 units wide and a total of 8 units tall.

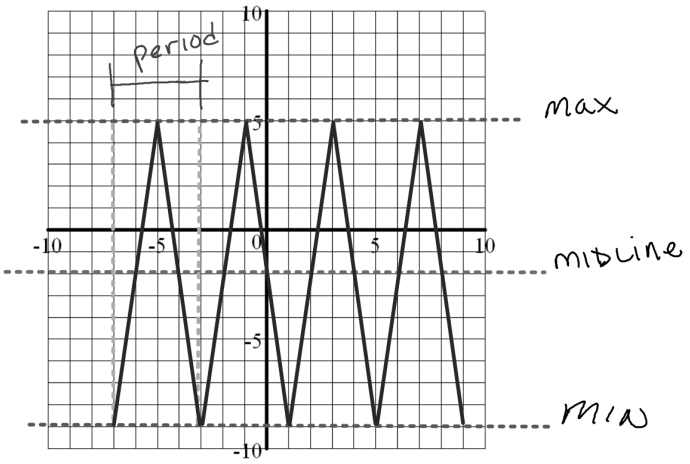
An example graph is shown.



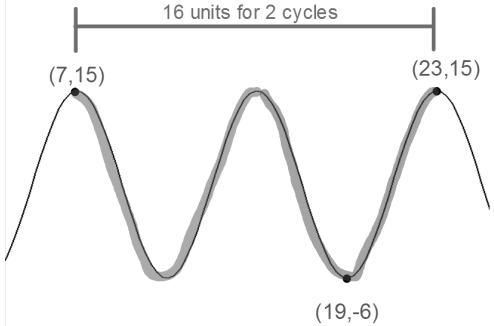
Sketch a periodic function with the following characteristics:

Period = 4
Amplitude = 7
Midline: y = -2

an example is given



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



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

Amplitude = $\frac{15-(-6)}{2} = 10.5$

Eq of Midline :

$y = \frac{15+(-6)}{2} = 4.5$

Suppose f is a periodic function with a period of 10

Given f(12)=23 and f(51) = 2

every 10 units left or right you will get the same y-value

Find f(32) = 23

X=32 is 20 units away from 12, 2 periods to the right.

This means $f(32) = f(12) = 23$

Find f(41) = 2

X=41 is 10 units away from 51, 1 period to the left.

This means $f(41) = f(51) = 2$

You can now finish Hwk # 7 Sec 13-1

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Problems 5-8, 11, 12, 20, 21, 23, 24, 32

DON'T copy and sketch two more cycles

Due Friday