Warm-up

Equation of Graph: $y = 2\cos\left[\frac{1}{2}(x-0)\right]+3$

$y = 2\cos\left[\frac{1}{2}(x)\right]+3$

Find:

Local Max: $\underline{\quad 5 \quad}$

Local Min: $\underline{\quad 1 \quad}$

Equation of Sinusiodal Axis:

$y = 3$ ✳

Period: $\underline{\quad 720 \quad}$

Amplitude: $\underline{\quad 2 \quad}$

Horizontal Translation (C): $\underline{\quad 0 \quad}$

Vertical Translation (D): $\underline{\quad 3 \quad}$ ✳

$K = \dfrac{360}{P} = \dfrac{360}{720}$

$= \frac{1}{2}$

━━ $+\sin$

$y = 2\sin\left[\frac{1}{2}(x-540)\right]+3$

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Questions from Homework

Equations in Standard Form

$$y = A \sin[k(x - C)] + D$$

A = *Amplitude* → influences how tall the sine curve is.

$K = \dfrac{360}{P}$ → influences how often the pattern repeats.

C = *Horizontal Translation* → Influences how far to the left or the right that the graph will shift.
- If C is positive → Shift Left
- If C is negative → Shift Right

D = *Vertical Translation* → influences how far up and down the graph will shift.
- If D is positive → Shift Up
- If D is negative → Shift Down

In which direction would these graphs be shifted?

$$y = \sin(x) + \underset{=}{2}$$
$+0$

$C = 0 \qquad D = 2$

Up

$$y = \sin(x - \underset{=}{30})$$

$C = 30 \qquad D = 0$

Right

$$y = -\cos(x) - 3$$

$C = 0 \qquad D = -3$

Down

$$y = \cos(x + \underset{=}{90})$$

$C = -90 \qquad D = 0$

Left

$$y = 2\cos[3(x + \underset{=}{45})] + 4$$

$C = -45 \qquad D = 4$

Left + Up

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Sketching Sinusoidal Functions using Mapping

Development of a standard form for sinusoidal functions...

Standard Form $\longrightarrow$ $y = A\sin[k(x - C)] + D$

1. Reflection: If A < 0 the graph will be reflected in the x-axis.

2. Amplitude: The amplitude of the graph will be equal to $|A|$. (positive)

3. Period: The period of the graph will be equal to $\dfrac{360°}{k}$

4. Horizontal Phase Shift: The graph will shift "C" units to the left.

5. Vertical Translation: The graph will shift "D" units up.

Mapping Notation: $(x, y) \rightarrow \left(\dfrac{x}{k} + C, Ay + D \right)$

Using Mapping to Graph!

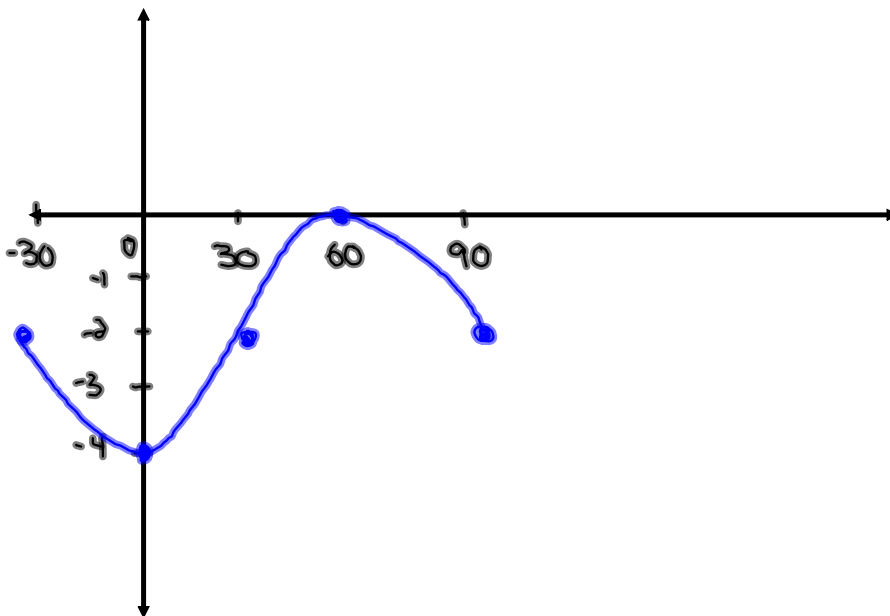$$y = -2\sin[3(x+30°)]-2 \qquad (x,y) \rightarrow \left(\frac{x}{k}+C, Ay+D\right)$$

A = 2 k = 3 C = $-30°$ D = -2 $P = \frac{360}{3} = 120$

$y = -\sin x$

x	y
0	0
90	-1
180	0
270	1
360	0

New points after mapping →

x	y
-30	-2
0	-4
30	-2
60	0
90	-2

Homework

What does Horizontal Translation look like?
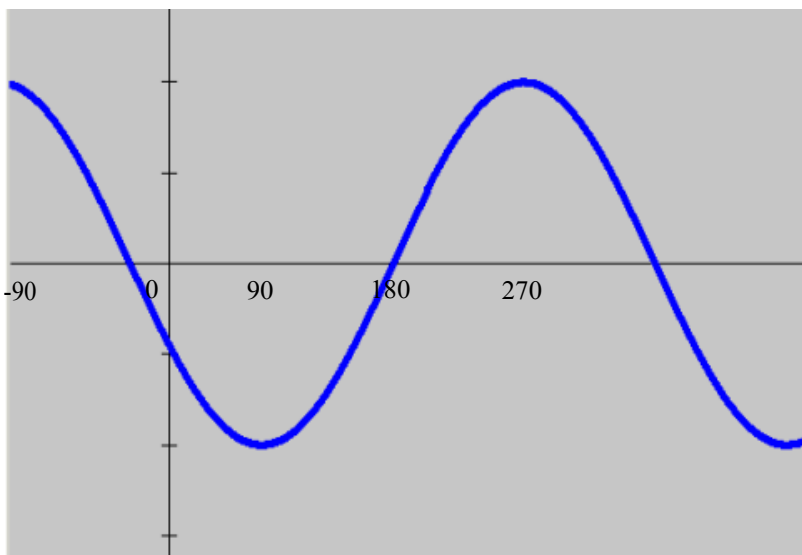
Find:

Local Max: _____

Local Min: _____

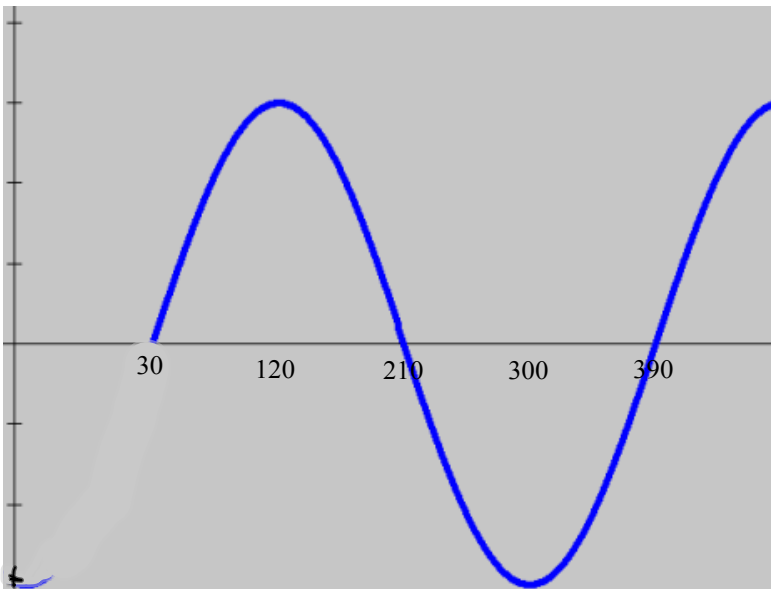Equation of Sinusiodal Axis:

_____

Period: _____

Amplitude: _____

Horizontal Translation (C): _____

Vertical Translation (D): _____

Equation of Graph: _____

Find:

Local Max: _____

Local Min: _____

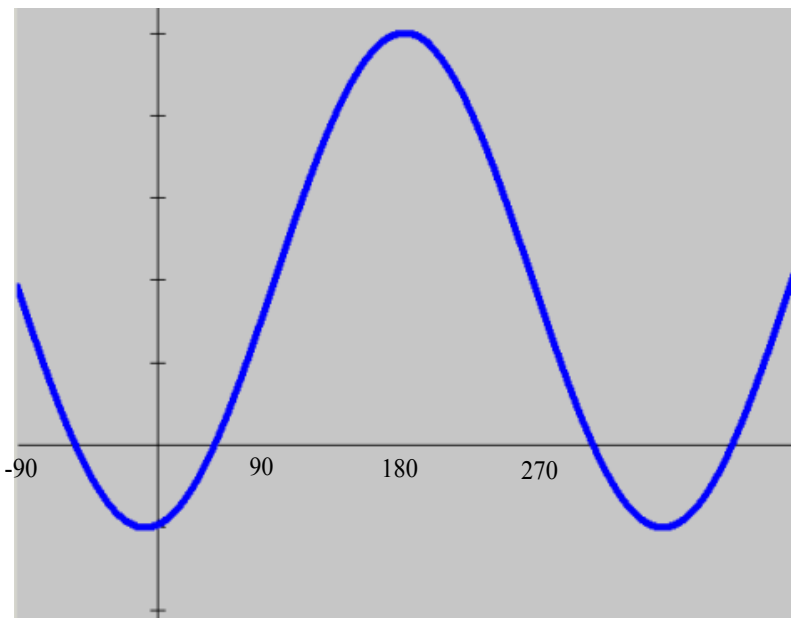Equation of Sinusiodal Axis:

_____

Period: _____

Amplitude: _____

Horizontal Translation (C): ____

Vertical Translation (D): _____

Equation of Graph: _____

A little "C" and "D"

Find:

Local Max: _____

Local Min: _____

Equation of Sinusiodal Axis:

_____

Period: _____

Amplitude: _____

Horizontal Translation (C): _____

Vertical Translation (D): _____

Equation of Graph: _____