

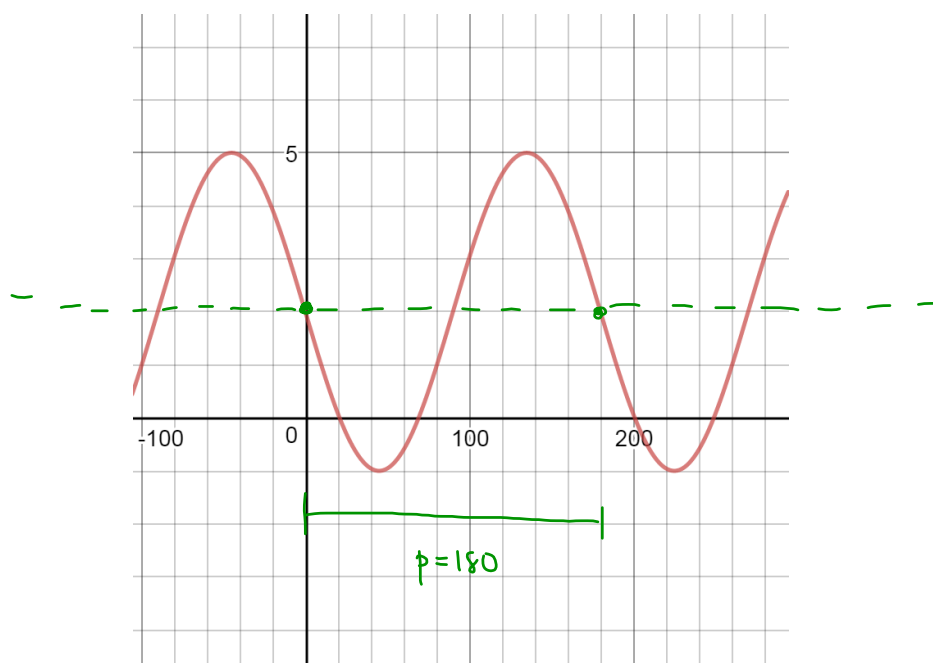
## Finding the Rule of a Sinusoidal Function

Goal:

- to be able to determine the rule of a sinusoidal function given enough information

How can we find the rule for the following function?

$$f(x) = a \sin b(x - h) + k$$



$$k = \frac{\text{max} + \text{min}}{2} = \frac{5 + (-1)}{2} = 2$$

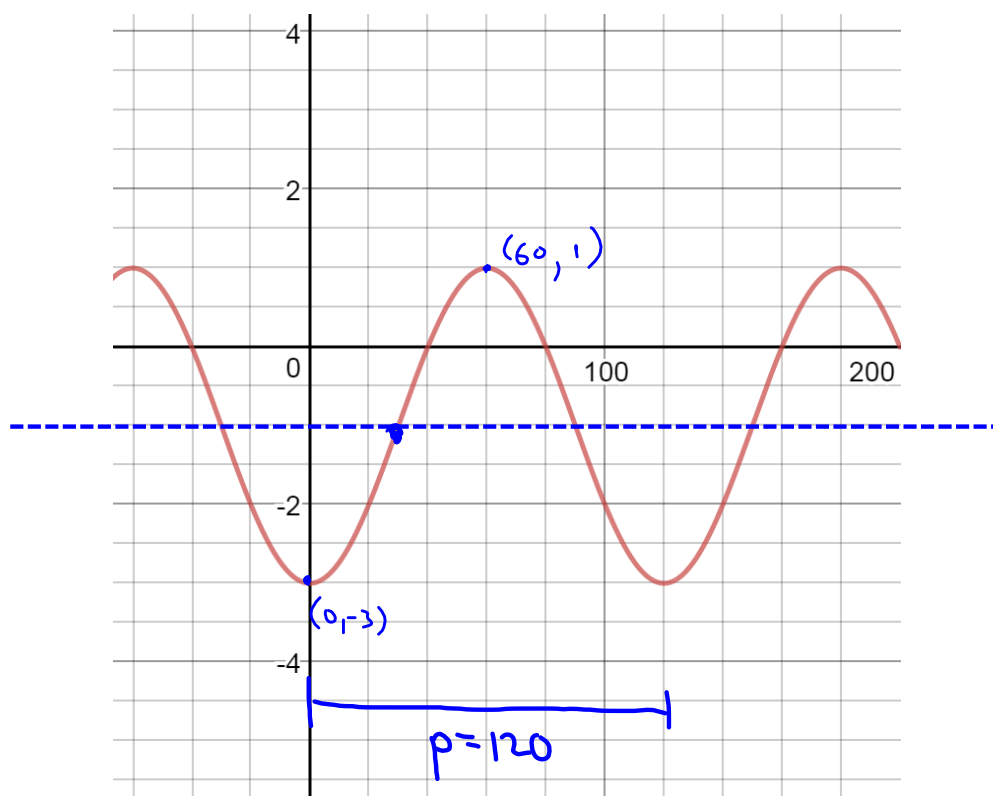
$h =$  any  $x$ -coord where  $f(x) = k = 0$

then  $a < 0$  

$$A = \frac{\text{max} - \text{min}}{2} = \frac{5 - (-1)}{2} = 3 \quad a = -3$$

$$p = 180^\circ \text{ (one wavelength)} \quad |b| = \frac{360^\circ}{p} = \frac{360^\circ}{180^\circ} = 2$$

$$f(x) = -3 \sin 2x + 2$$



$$k = \frac{\max + \min}{2} = \frac{1 + (-3)}{2} = -1$$

$$A = \frac{\max - \min}{2} = \frac{1 - (-3)}{2} = 2$$

$$h = \frac{x_{\max} + x_{\min}}{2} = \frac{60 + 0}{2} = 30$$

$$a = +2$$

$$|b| = \frac{360^\circ}{p} = \frac{360^\circ}{120^\circ} = 3$$

$$f(x) = 2\sin 3(x - 30) - 1$$