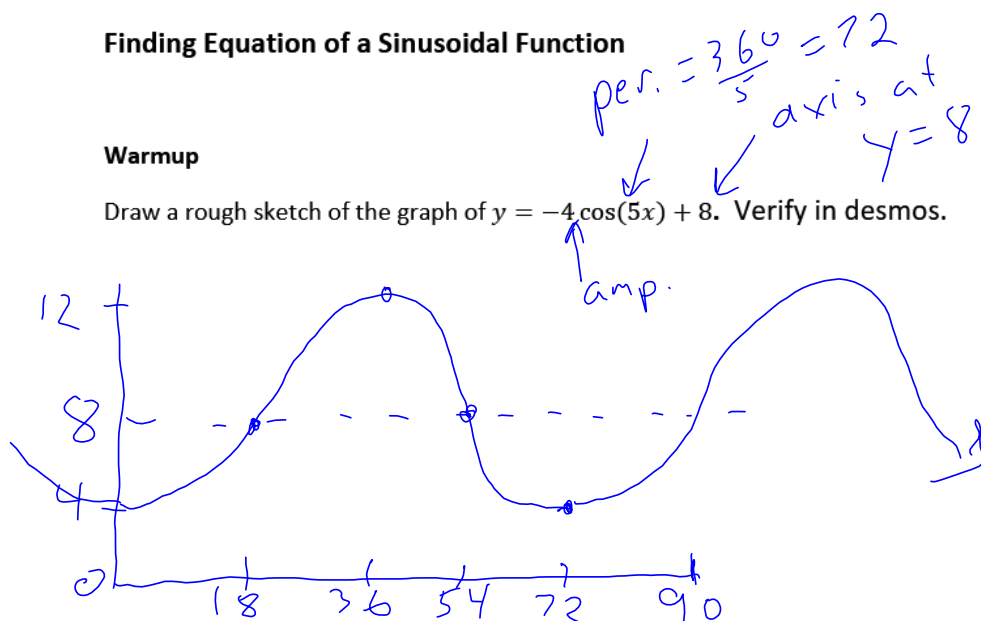


Finding Equation of a Sinusoidal Function

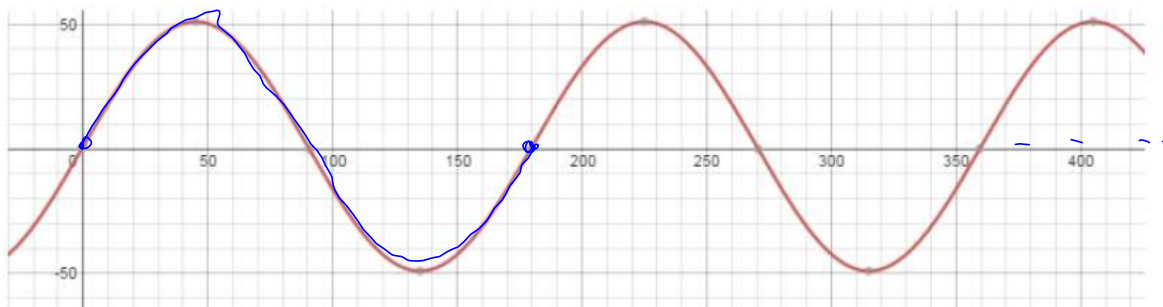
Warmup

Draw a rough sketch of the graph of $y = -4\cos(5x) + 8$. Verify in desmos.



Example 1

Find an equation for the sinusoidal function pictured below.

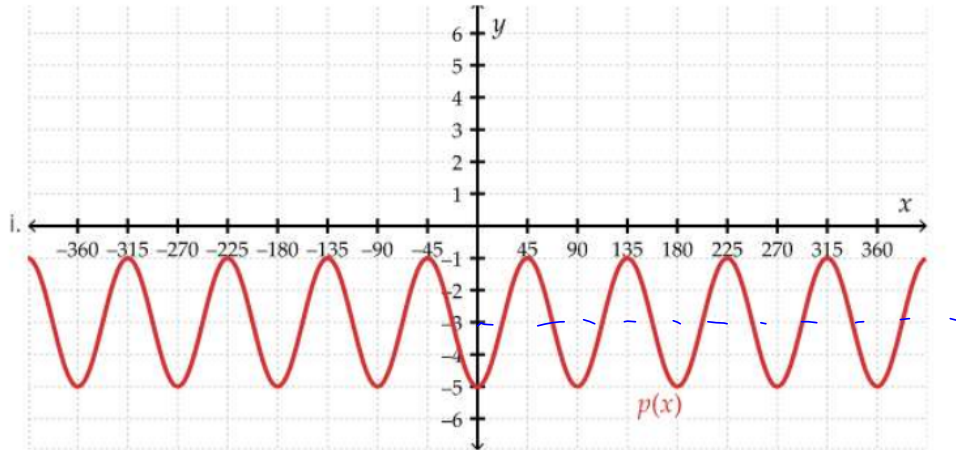


axis at $y = 0$
 $y = 50\sin 2x$

amp. = 50
period = 180

Example 2

Find the equation of $p(x)$ given its graph pictured below.



$$\text{axis at } y = \frac{-5 + -1}{2} \rightarrow y = -3$$

$$\text{amp.} = 2 \quad \text{period} = 90$$

$$y = -2 \cos 4x - 3$$

$$\text{period} = \frac{360}{k}$$

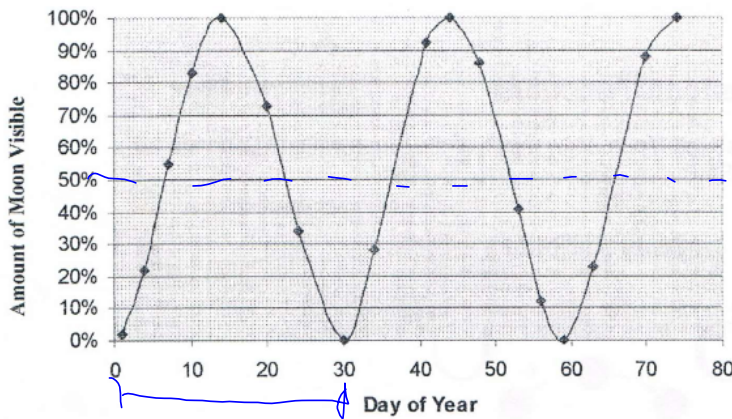
$$90 = \frac{360}{k}$$

$$90k = 360$$

$$k = 4$$

Example 3

The graph below shows the relationship between the day of the year and the amount of visible moon, for a specific year.



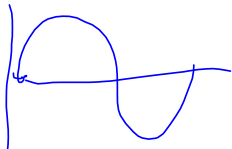
amp. = 50

$y = 50$
period = 30

$30 = \frac{360}{k}$

Find an equation for this relationship. Use your equation to predict the amount of visible moon on day 150.

sine

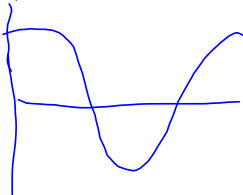


$30k = 360$

$k = \frac{360}{30}$

$k = 12$

cosine



$A(d) = 50 \cos(12d) + 50$

$A(150) = -50 \cos(12(150)) + 50$
 $= 0$

$A(93) = -50 \cos(12(93)) + 50$
 $= 9.5$ 9.5%