6.6-6.7 Models of Sinusoidal Functions

creating the equation of $\sin(x)$ and $\cos(x)$

3 ways:

1. Graph
2. Table
3. Words

Infinite answers!!!

$a, -a$ k c

= amp, period, eqn of axis is the same

$-$ phase shift is different

d

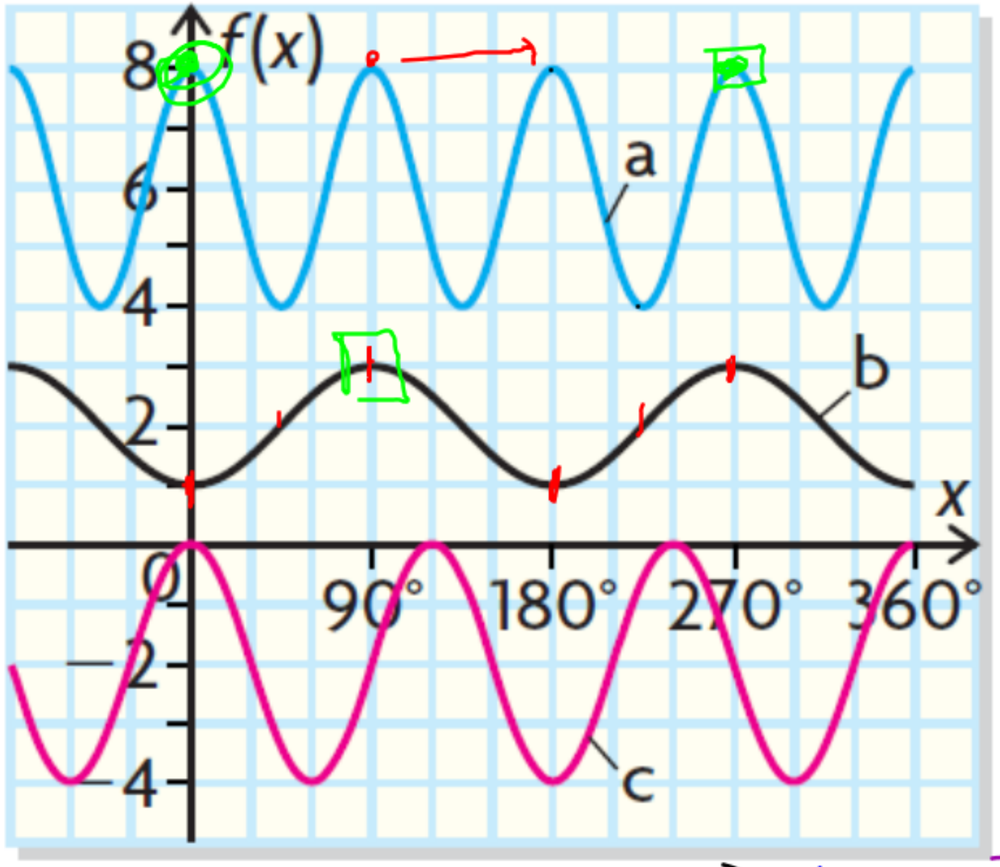
Remember: "starts at" = y-intercept

+ sin(x) starts at 0 (middle) then goes up to the peak.

− sin(x) starts at 0 then goes down to trough

+ cos(x) starts at peak

− cos(x) starts at trough.



a) $P = 8$, $T = 4$ $\therefore$ $y = 6$ (c)

amp $= 2$ (a)

Period $= 90°$ $\therefore k = \frac{360}{90} = 4$ (k)

$$f(x) = 2\cos(4(x + \overset{-270}{\square})) + 6$$

how far from y-axis

b) $P = 3$, $T = 1$ $\therefore y = 2$ (c)

amp $= 1$ (a)

Period $= 180°$

$\therefore k = \frac{360}{180} = 2$

$$y = -1\cos(2(x + \square)) + 2$$

$$y = 1\cos(2(x - 90)) + 2$$

x	0°	45°	90°	135°	180°	225°	270°
y	9	7	5	7	9	7	5

Peak = 9, Trough: 5, $y = 7$ (c)

Amp = 2 (a)

Period = 180 $\therefore$ $k = \frac{360}{180} = 2$ (k)

$f(x) = 2\cos(2(x+0)) + 7$

$f(x) = 2\sin(2(x-135)) + 7$

A sinusoidal function has an amplitude of 4 units, a period of 120°, and a maximum at (0, 9). Determine the equation of the function.

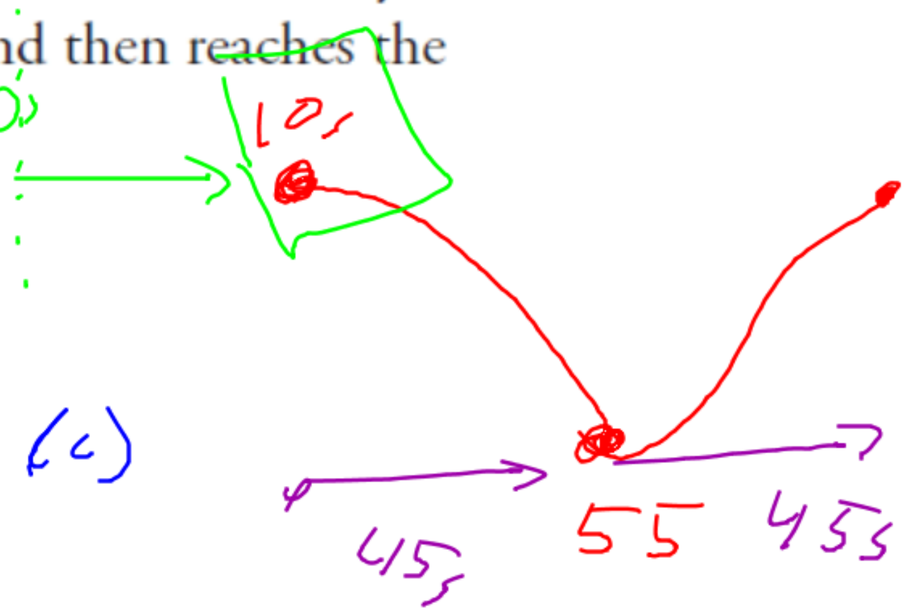
amp = 4 (a)

Period: 120 $\therefore$ $k = \frac{360}{120} = 3$ (k)

Max = Peak = 9 $\therefore$ $y = 5$ (c)

$f(x) = 4\cos(3x) + 5$

A group of students is tracking a friend, John, who is riding a Ferris wheel. They know that John reaches the maximum height of 11 m at 10 s and then reaches the minimum height of 1 m at 55 s.



$(10, 11)$ and $(55, 1)$

Peak = 11, Trough = 1 $\therefore$ $y = 6$ (c)

Amp = 5 (a)

$\therefore 90_{sec}$

Period = 90 $\therefore$ $k: \frac{360}{90} = 4$

$$f(x) = 5\cos(4(x - 10)) + 6$$

How high after 2 min?

↳ 120 seconds.

$$f(120) = 5\cos(4(120-10)) + 6$$

$$f(120) = 5\cos(440) + 6$$

$$f(120) = 6.9\ m$$