8.4 Sin + Cos Functions

June 2, 2016 2:05 PM

More precise eqn

$$y = a\sin b(x-c) + d$$

or

$$y = a\cos b(x-c) + d$$

a = amplitude $\qquad a = \frac{\max - \min}{2}$

$b \rightarrow$ period $\qquad$ period $= \frac{360^\circ}{b}$ or $= \frac{2\pi}{b}$

↑ use this if any #'s in eqn or on x-axis are in degrees.

c = horizontal shift

$(x-c) \rightarrow$ shift to the right

$(x+c) \rightarrow$ shift to the left

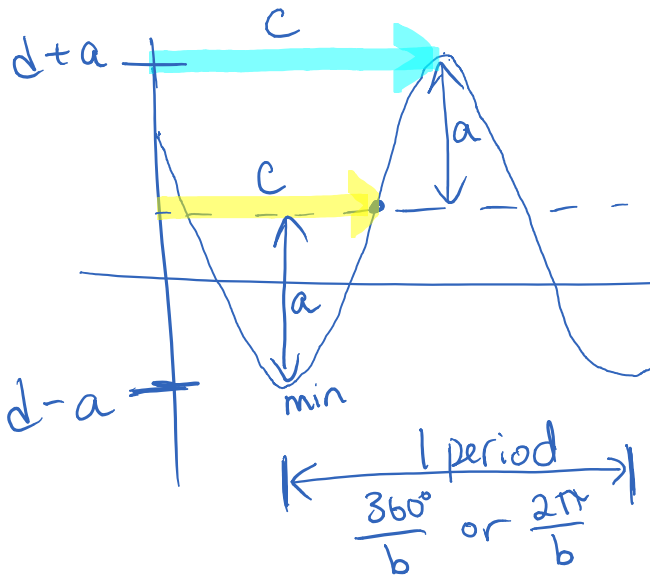
$x - -c$

Note: for "c" shift :- if sine, then shift from $x=0$ along midline

- if cosine, then shift along line at top of curve (max)

d = midline $\qquad y = d$ ← equation of midline

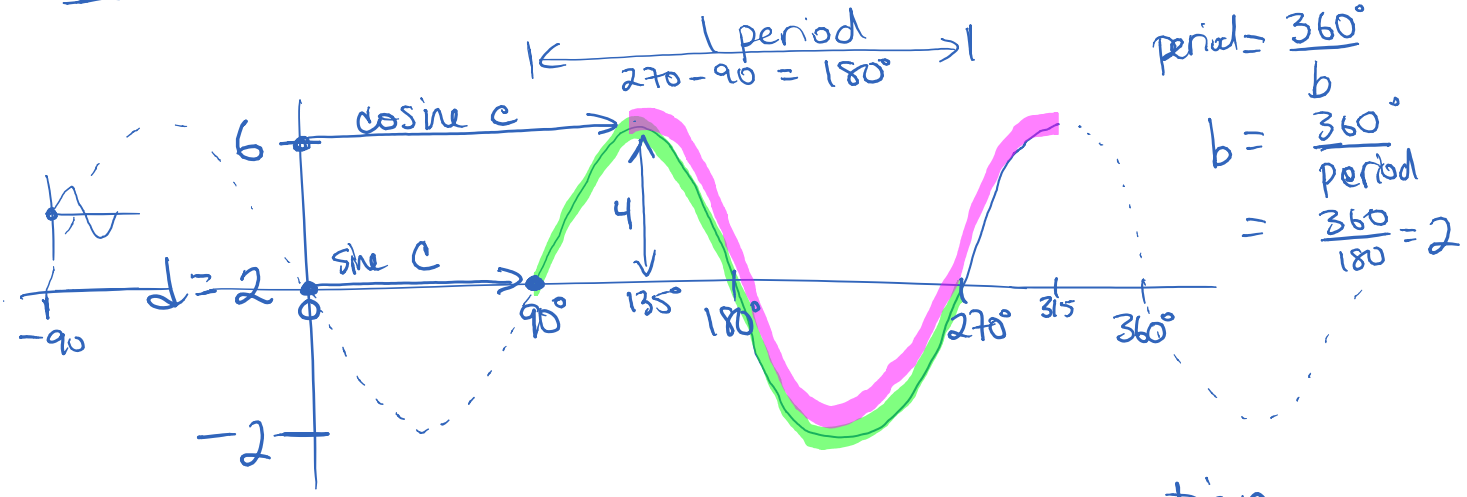
$$d = \frac{\max + \min}{2}$$



$y = a\sin b(x-c)+d$

$y = a\cos b(x-c)+d$

Ex 1. Find eqn if given graph



period $= \frac{360°}{b}$

$b = \frac{360°}{\text{period}} = \frac{360}{180} = 2$

sine equation

$y = a\sin b(x-c)+d$

$y = 4\sin 2(x-90°)+2$

or

$y = 4\sin 2(x+90°)+2$

cosine equation

$y = a\cos b(x-c)+d$

$y = 4\cos 2(x-135°)+2$

or

$y = 4\cos 2(x-315°)+2$

Ex2 Given eqn, draw graph

$y = -5\sin 2(x+\pi) - 1$

$a = 5$

$y = 5\sin 2(x + \pi) - 1$

domain is $-\pi$ to 2π

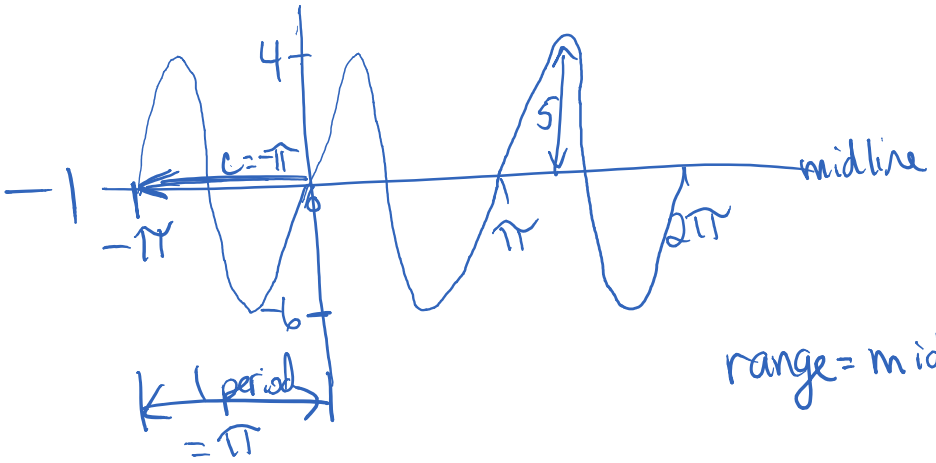
$a = 5$

$b = 2$

period $= \frac{2\pi}{2} = \pi$

$c = -\pi$

$d = -1$ midline



range = midline ± amp

Practice pg 558 (will be collected tomorrow)

#1-4, (5-7, 9)a, 12, 13b, 14a