September 25

In the equation $y = A\cos(Bx + C) + D$,
How does each constraint (A, B, C, D) change the graph?

Don't forget to keep ranking your days!!

September 23

Students will verbally explain how to graph sine and cosine functions

(using the words:
range, right triangles, periodic...)

☺ Converting between degrees and radians
☺ Unit Circle questions
☺ Graphs of Sine and Cosine

(Amplitude + Vertical Shift)

5. For functions of the form $f(x) = a\sin(bx + c) + d$ or $g(x) = a\cos(bx + c) + d$, with $a \neq 0$ and $b > 0$,

   a. the amplitude is a.

   b. the period is $\frac{2\pi}{b}$. (length of 1 cycle)

   c. the horizontal shift is $\frac{-c}{b}$.

   d. the vertical shift is d.

Write an equation of a sine curve with

Amplitude = 3

Period = π

Horizontal Shift = -4

Vertical Shift = 5

$y = A\sin(Bx + C) + D$

$A = 3 \quad D = 5$

$B = 2 \quad C = 8$

$y = 3\sin(2x + 8) + 5$

$\frac{2\pi}{B} = \text{Period}$

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

$B\left(\frac{2\pi}{B}\right) = (\pi)B$

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

$2 = B$

$\frac{-c}{b} = \text{horiz. shift}$

$\frac{-c}{2} = -4$

$2\left(\frac{-c}{2}\right) = (-4)2$

$\frac{-c}{-1} = \frac{-8}{-1}$

$c = 8$

Write an equation of a cosine curve with:

Amplitude = 7

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

Horizontal Shift = 2

Vertical Shift = 5

$y = A\cos(Bx + C) + D$

$A = 7 \quad C = -8$

$B = 4 \quad D = 5$

$y = 7\cos(4x - 8) + 5$

$\frac{2\pi}{B} = \text{Period}$

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

$B\left(\frac{2\pi}{B}\right) = \left(\frac{\pi}{2}\right)B$

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

$2(2\pi) = \frac{\pi}{2}B(2)$

$\frac{4\pi}{\pi} = \frac{\pi B}{\pi} \to B = 4$

$\frac{-c}{b} = \text{Horiz Shift}$

$\frac{-c}{4} = 2$

$4\left(\frac{-c}{4}\right) = (2)4$

$\frac{-c}{-1} = \frac{8}{-1}$

$c = 8$

Write an equation of a sine curve with:

Amplitude = 2

Period = 2

Horizontal Shift = 1

Vertical Shift = 1

Reflection over x-axis

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

$-\frac{c}{b}$ = horiz. shift

$$-2\sin(\pi x - \pi) + 1$$