7-4: Trigonometric Graph Features Notes Featured Student: Date:

Warm Up: Why are the graphs of $y = cos(x)$ and $y = sin(x)$ examples of periodic functions? How long is one period of each graph? (How long does it take before the graphs repeat?)

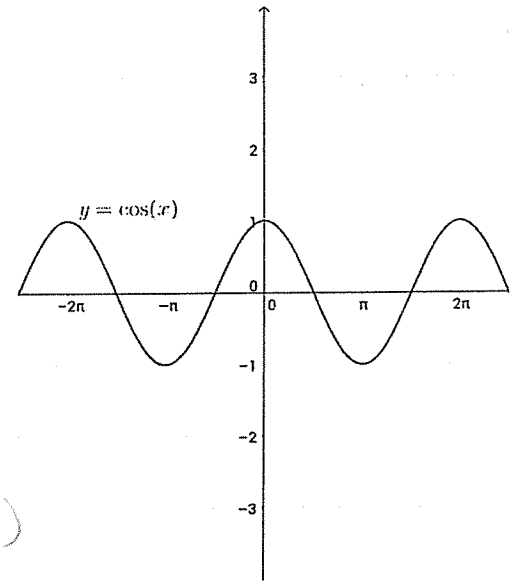
Periodic functions repeat in predictable ways, Sine and cosine have a repeating pattern every 360° or 2π radians.

1. How does the graph of $y = cos(x)$ compare to the graph of $y = 3cos(x)$? What about $y = -3cos(x)$? Why do those changes occur?

$3\cos(x) \rightarrow$ vertical stretch of 3 (3x taller than before)

Draw both graphs

$-3\cos(x) \rightarrow$ Vertical stretch of 3 and vertical reflection (reflect over the x-axis)

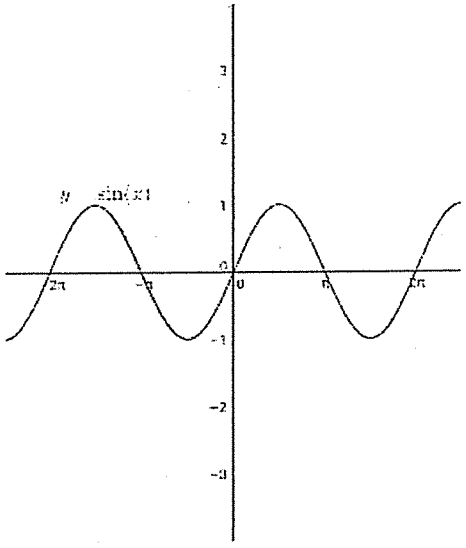


2. How does the graph of $y = sin(x)$ compare to the graph of $y = sin(2x)$? What about $y = sin(\frac{1}{2}x)$? Why do those changes occur?

$\sin(2x) \rightarrow 2x$ faster than it originally was.
Original period: 2π
New period: π

Sketch both graphs

$\sin(\frac{1}{2}x) \rightarrow \frac{1}{2}$ as fast as original.
Original period: 2π
New period: 4π



$Y = A \cdot \sin(Bx)$ $Y = A \cdot \cos(Bx)$

3. Take your own notes here on the features of sine and cosine graphs: period, amplitude, and midline.

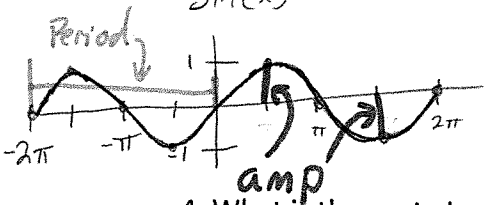
Period = Time it takes for graph to repeat. Period = 2π normally

$2\pi/B$ = period length.

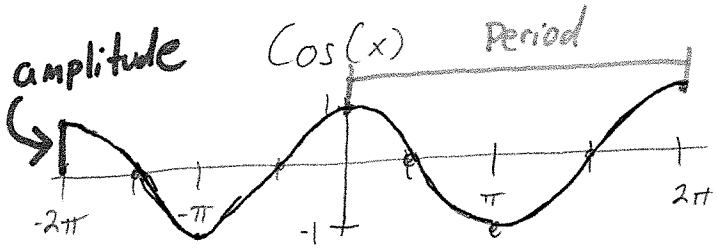
Amplitude = Dist from midline to top or bottom. $|A|$ in equation

Midline = Line in middle of graph. Normally $y=0$. (x-axis)

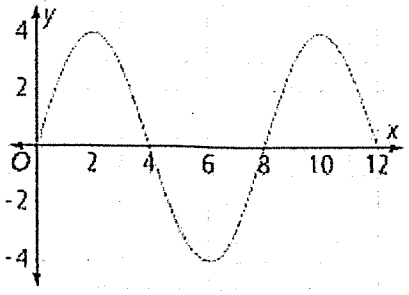
Sin(x)



Cos(x)



4. What is the period and amplitude of the graph below?



5. Determine the period and amplitude of the functions below.

a. $y = -\sin(2x)$ b. $y = \frac{1}{3}\cos(\frac{1}{2}x)$ c. $y = 2\sin(\pi x)$

6. Write the equation for the graph shown in #4.