

8.3 – Graphing Sine and Cosine Functions

Periodic Function and Period

- One basic property of both the sine and the cosine function → considered _____
- **periodic function** → a function that _____
at _____ where _____.
- **period (of a periodic function)** → the _____ of _____

Example 1: Determine if the given function is periodic. If so, state the period.

<p>a.) </p> <p>Periodic? Yes No</p> <p>Period = _____</p>	<p>b.) </p> <p>Periodic? Yes No</p> <p>Period = _____</p>	<p>c.) </p> <p>Periodic? Yes No</p> <p>Period = _____</p>	<p>d.) </p> <p>Periodic? Yes No</p> <p>Period = _____</p>
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Graph of Trig Function # 1 - Sine	Graph of Trig Function # 2 - Cosine																																								
<p style="text-align: center;">Make a table of domain values between $\pm 2\pi$ for the function of $y = \sin(x)$</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td></tr> <tr><td style="height: 20px;"></td><td style="height: 20px;"></td><td style="height: 20px;"></td><td style="height: 20px;"></td><td style="height: 20px;"></td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td></tr> <tr><td style="height: 20px;"></td><td style="height: 20px;"></td><td style="height: 20px;"></td><td style="height: 20px;"></td><td style="height: 20px;"></td></tr> </table> <div style="text-align: center;"> </div> <p><u>Characteristics of the Sine Function:</u></p> <p>Domain: _____ Range: _____</p> <p>Period: _____ Amplitude: _____</p> <p>Important Part of Graph: Domain is Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>1.) _____</p> <p>2.) _____</p> <p>3.) _____</p> </div> <div style="width: 45%;"> <p>4.) _____</p> <p>5.) _____</p> <p>looks like a _____</p> </div> </div>																					<p style="text-align: center;">Make a table of domain values between $\pm 2\pi$ for the function of $y = \cos(x)$</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td></tr> <tr><td style="height: 20px;"></td><td style="height: 20px;"></td><td style="height: 20px;"></td><td style="height: 20px;"></td><td style="height: 20px;"></td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td><td style="width: 20%; height: 20px;"></td></tr> <tr><td style="height: 20px;"></td><td style="height: 20px;"></td><td style="height: 20px;"></td><td style="height: 20px;"></td><td style="height: 20px;"></td></tr> </table> <div style="text-align: center;"> </div> <p><u>Characteristics of the Cosine Function:</u></p> <p>Domain: _____ Range: _____</p> <p>Period: _____ Amplitude: _____</p> <p>Important Part of Graph: Domain is Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>1.) _____</p> <p>2.) _____</p> <p>3.) _____</p> </div> <div style="width: 45%;"> <p>4.) _____</p> <p>5.) _____</p> <p>looks like a _____</p> </div> </div>																				

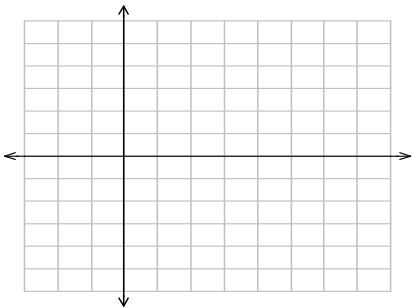
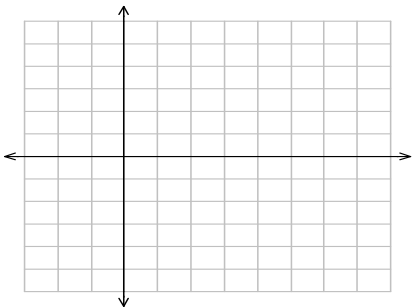
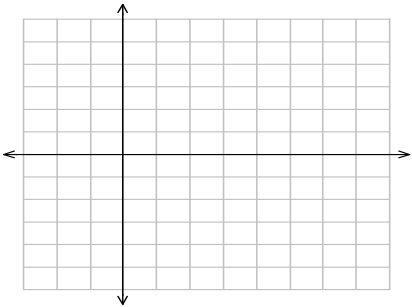
Graphing the Sine / Cosine Function: $y = f(x) = a \sin(bx \pm c) \pm d$ or $y = f(x) = a \cos(bx \pm c) \pm d$

- Each parameter (letter) affects the graph of $y = a \sin/\cos(bx \pm c) \pm d$ differently:
 - Parameter _____ affects the _____ of $f(x)$ where _____ is called the _____
 - Parameter _____ affects the _____ of $f(x)$ where the _____
 - Parameter _____ affects the _____ of $f(x)$ where _____
 - If _____ then the graph shifts to the _____
 - If _____ then the graph shifts to the _____
 - Parameter _____ affects the _____ of $f(x)$
 - If _____ then the graph shifts _____
 - If _____ then the graph shifts _____

Example 2: State the amplitude, period, phase shift, and vertical shift of each function.

Function	Amplitude	Period	Phase Shift	Vertical Shift
a.) $y = 3 \sin(2x) + 1$				
b.) $y = -2 \cos\left(x + \frac{\pi}{2}\right)$				
c.) $y = \sin(4x - \pi) - 3$				
d.) $y = \frac{1}{2} \cos\left(\frac{1}{4}x + \pi\right) + 2$				

Example 3: Graph each function by finding the amplitude, period, phase shift, and vertical shift.

a.) $y = 3 \sin(x - \pi) + 2$ 	b.) $y = 2 \sin\left(2x + \frac{\pi}{2}\right) - 4$ 
c.) $y = 3 \cos\left(x - \frac{3\pi}{2}\right) - 1$ 	d.) $y = 4 \cos\left(\frac{1}{2}x + \pi\right) + 1$ 