

Name: _____

Date: _____

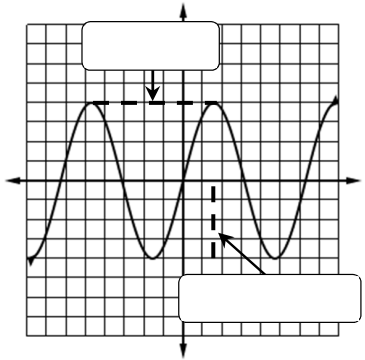
Topic: _____

Class: _____

Main Ideas/Questions **Notes/Examples**

PERIODIC FUNCTIONS

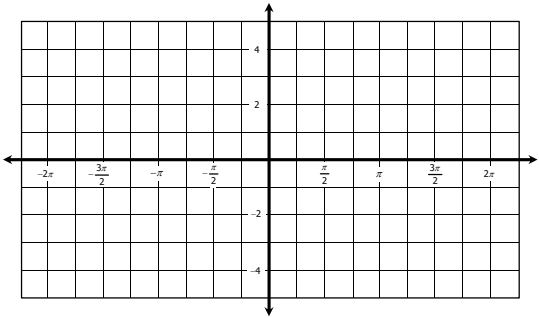
- Periodic functions are functions that repeat exactly in regular intervals, called **cycles**.
- Trigonometric functions are periodic!
- **Period:** the length of a cycle. Periods can start at any point on the graph.
- **Amplitude:** Half the distance between the minimum and maximum values.



GRAPHING SINE & COSINE

Use the unit circle values! x represents the angle θ in standard form and y represents the corresponding trigonometric value.

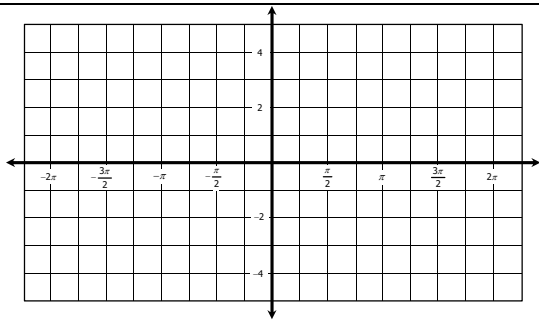
SINE
($y = \sin \theta$)



Amplitude:

Period:

COSINE
($y = \cos \theta$)



Amplitude:

Period:

The graphs of sine and cosine are called "waves" because they have a wave-like rolling appearance.

Changing the Amplitude & Period

Given $y = a \cdot \sin b\theta$ or $y = a \cdot \cos b\theta$ where θ is in radians:
the amplitude is _____ and the period is _____.

Directions: Identify the amplitude and period of each function.

1. $y = 3 \cdot \sin 2\theta$

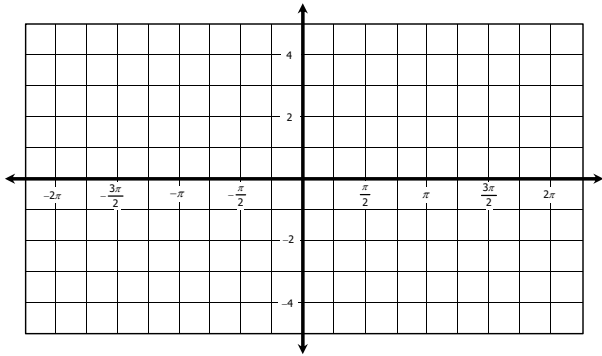
Amp: _____ **Period:** _____

2. $y = \frac{3}{2} \cdot \sin \frac{1}{3}\theta$

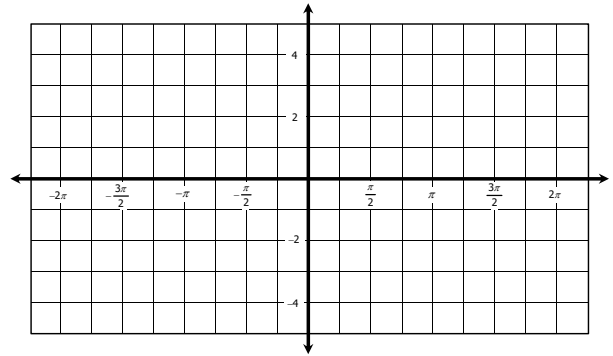
Amp: _____ **Period:** _____

Directions: Identify the amplitude and period, then graph each function.

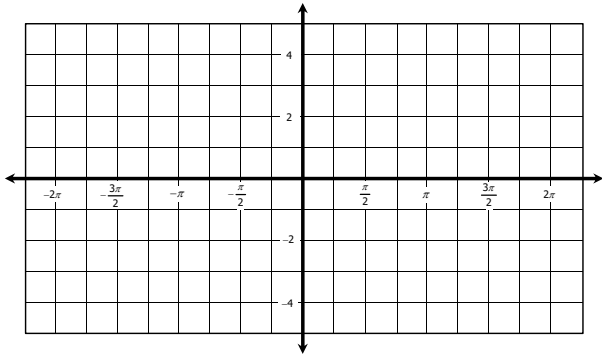
3. $y = 4 \cdot \sin \theta$ Amp: _____ Period: _____



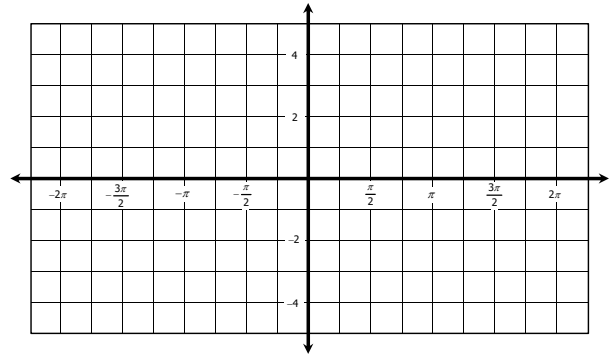
4. $y = \cos \frac{1}{2}\theta$ Amp: _____ Period: _____



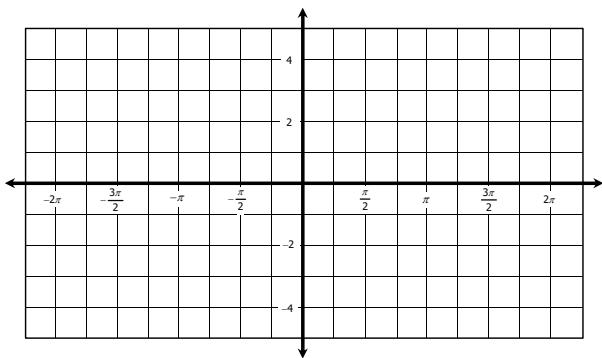
5. $y = \frac{1}{2} \cdot \cos 3\theta$ Amp: _____ Period: _____



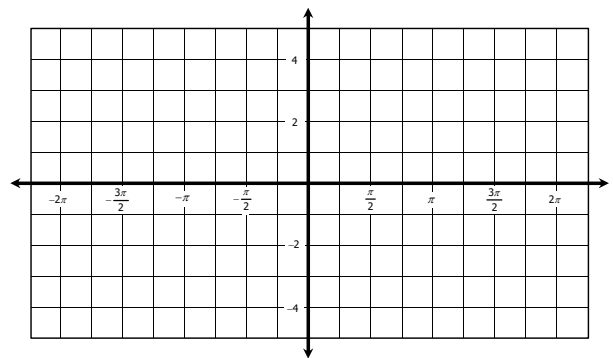
6. $y = 5 \cdot \sin \frac{1}{3}\theta$ Amp: _____ Period: _____



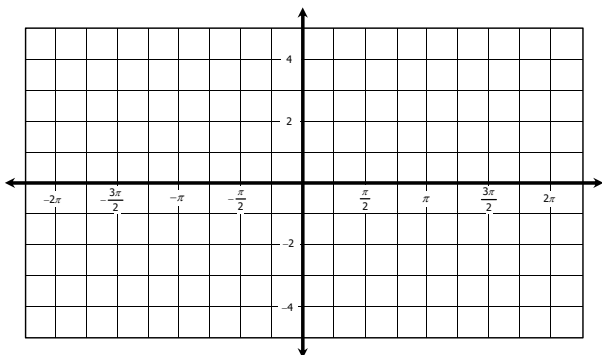
7. $y = \cos \frac{3}{4}\theta$ Amp: _____ Period: _____



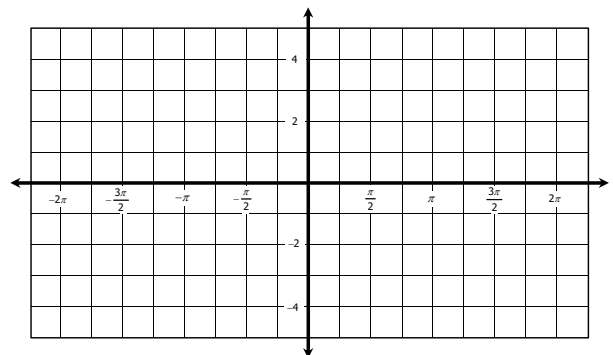
8. $y = \frac{5}{2} \cdot \sin \theta$ Amp: _____ Period: _____



9. $y = 3 \cdot \sin 2\theta$ Amp: _____ Period: _____



10. $y = 2 \cdot \cos \frac{3}{2}\theta$ Amp: _____ Period: _____



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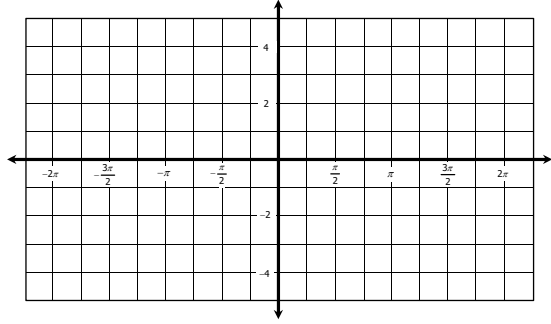
Class: _____

Main Ideas/Questions Notes/Examples

TANGENT GRAPHS

The tangent function is one of the trigonometric functions whose graphs have asymptotes. Graph the function below and show the asymptotes.

TANGENT
($y = \tan \theta$)



Amplitude:

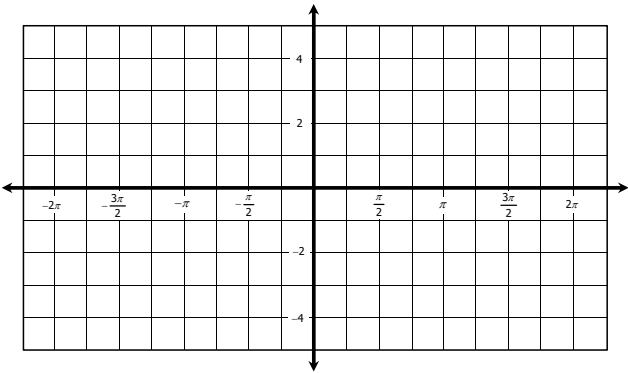
Period:

Changing the Period & Asymptotes

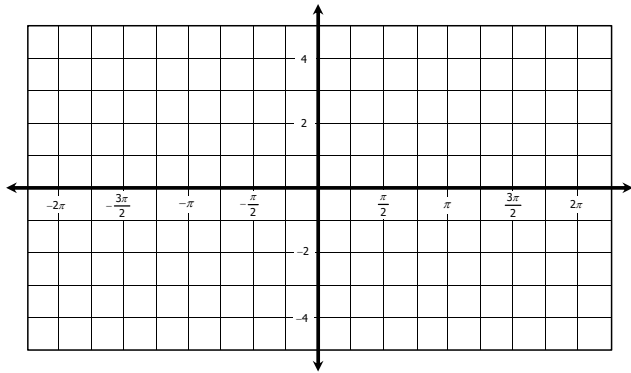
Given $y = a \cdot \tan b\theta$ where θ is in radians, the period is _____, and the asymptotes are _____ multiples of _____.

Directions: Identify the period, then graph each function.

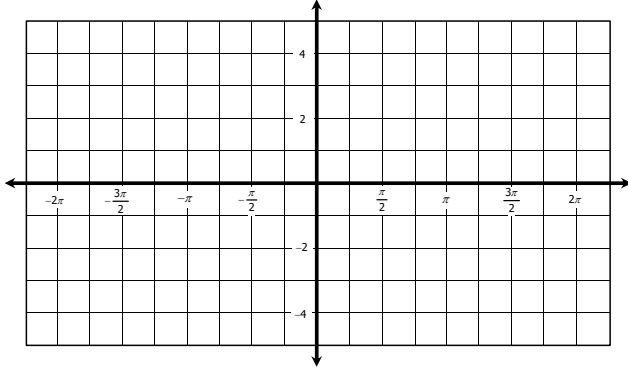
1. $y = 2 \cdot \tan \theta$ **Period:** _____



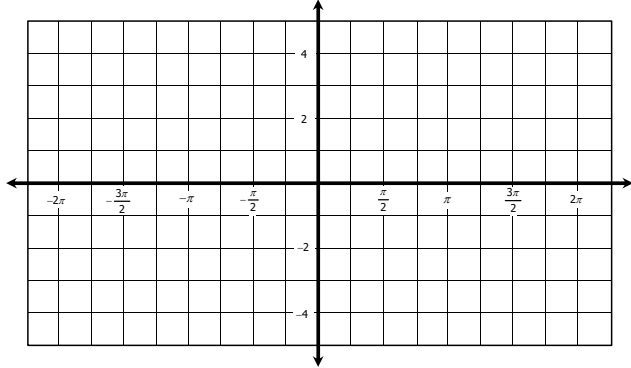
2. $y = \tan \frac{1}{3}\theta$ **Period:** _____



3. $y = \frac{1}{2} \cdot \tan 2\theta$ **Period:** _____



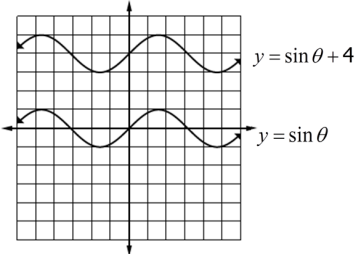
4. $y = 4 \cdot \tan \frac{1}{2}\theta$ **Period:** _____



Graphing Trigonometric Functions

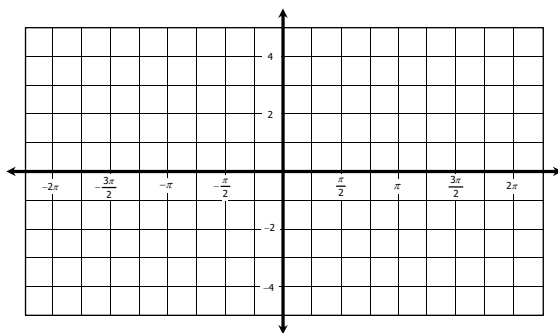
	Function & Graph	Amplitude & Period	Example
SINE	<input type="text"/> 	<input type="text"/> Amplitude = _____ Period = _____	$y = 4 \cdot \sin \frac{1}{2} \theta$ Amp: _____ Period: _____
COSINE	<input type="text"/> 	<input type="text"/> Amplitude = _____ Period = _____	$y = \frac{3}{2} \cdot \cos 2 \theta$ Amp: _____ Period: _____
TANGENT	<input type="text"/> 	<input type="text"/> Amplitude = _____ Period = _____	$y = 2 \cdot \tan \frac{1}{3} \theta$ Amp: _____ Period: _____

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples		
<p>TRANSFORMATIONS: Phase Shifts & Vertical Shifts</p> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; width: fit-content; margin: 10px auto;"> $y = a \cdot \sin b(\theta - h) + k$ $y = a \cdot \cos b(\theta - h) + k$ $y = a \cdot \tan b(\theta - h) + k$ </div>	<p>Like other functions, trigonometric functions can be translated.</p> <p>➤ Phase Shifts: (Horizontal Shifts)</p> <ul style="list-style-type: none"> • $+h$ shifts _____ and $-h$ shifts _____. • Examples: (a) $y = \sin(\theta - \pi)$ shifts _____ units to the _____. <li style="padding-left: 100px;">(b) $y = \tan\left(\theta + \frac{\pi}{4}\right)$ shifts _____ units to the _____. <p>➤ Vertical Shifts:</p> <ul style="list-style-type: none"> • $+k$ shifts _____ and $-k$ shifts _____. • Examples: (c) $y = \tan \theta + 2$ shifts _____ units _____. <li style="padding-left: 100px;">(d) $y = \cos \theta - 4$ shifts _____ units _____. 		
<p>PUTTING IT ALL TOGETHER</p>	<p>Using the sine function as an example, label each part:</p> $y = a \cdot \sin b(\theta - h) + k$		
<p>MIDLINE</p>	<ul style="list-style-type: none"> • Shifting a graph vertically will create a new horizontal axis, called the _____. • This is the reference line to which a graph oscillates. • The equation for the midline is _____. 		
<p>DESCRIBING TRANSFORMATIONS</p>	<p>Directions: State the amplitude, period, phase shift, vertical shift, and midline for each function.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top; padding: 10px;"> <p>1. $y = \frac{1}{2} \sin 3\theta - 5$</p> <p style="text-align: center;">Amplitude: _____</p> <p style="text-align: center;">Period: _____</p> <p style="text-align: center;">Phase Shift: _____</p> <p style="text-align: center;">Vertical Shift: _____</p> <p style="text-align: center;">Midline: _____</p> </td> <td style="width: 50%; vertical-align: top; padding: 10px;"> <p>2. $y = 4 \cdot \tan 2(\theta + 2\pi) + 1$</p> <p style="text-align: center;">Amplitude: _____</p> <p style="text-align: center;">Period: _____</p> <p style="text-align: center;">Phase Shift: _____</p> <p style="text-align: center;">Vertical Shift: _____</p> <p style="text-align: center;">Midline: _____</p> </td> </tr> </table>	<p>1. $y = \frac{1}{2} \sin 3\theta - 5$</p> <p style="text-align: center;">Amplitude: _____</p> <p style="text-align: center;">Period: _____</p> <p style="text-align: center;">Phase Shift: _____</p> <p style="text-align: center;">Vertical Shift: _____</p> <p style="text-align: center;">Midline: _____</p>	<p>2. $y = 4 \cdot \tan 2(\theta + 2\pi) + 1$</p> <p style="text-align: center;">Amplitude: _____</p> <p style="text-align: center;">Period: _____</p> <p style="text-align: center;">Phase Shift: _____</p> <p style="text-align: center;">Vertical Shift: _____</p> <p style="text-align: center;">Midline: _____</p>
<p>1. $y = \frac{1}{2} \sin 3\theta - 5$</p> <p style="text-align: center;">Amplitude: _____</p> <p style="text-align: center;">Period: _____</p> <p style="text-align: center;">Phase Shift: _____</p> <p style="text-align: center;">Vertical Shift: _____</p> <p style="text-align: center;">Midline: _____</p>	<p>2. $y = 4 \cdot \tan 2(\theta + 2\pi) + 1$</p> <p style="text-align: center;">Amplitude: _____</p> <p style="text-align: center;">Period: _____</p> <p style="text-align: center;">Phase Shift: _____</p> <p style="text-align: center;">Vertical Shift: _____</p> <p style="text-align: center;">Midline: _____</p>		

Directions: State the amplitude, period, phase shift, vertical shift, and midline for each function. Then graph each function.

3. $y = \sin 2\left(\theta + \frac{\pi}{2}\right)$



Amplitude: _____

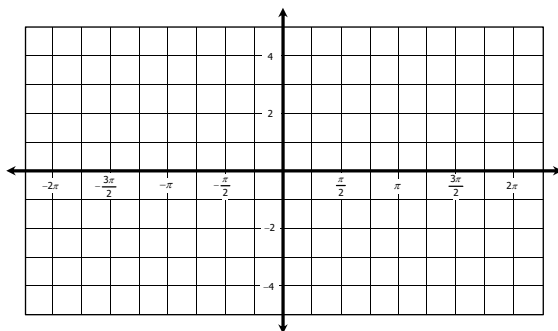
Period: _____

Phase Shift: _____

Vertical Shift: _____

Midline: _____

4. $y = \frac{1}{2} \cdot \tan \theta - 3$



Amplitude: _____

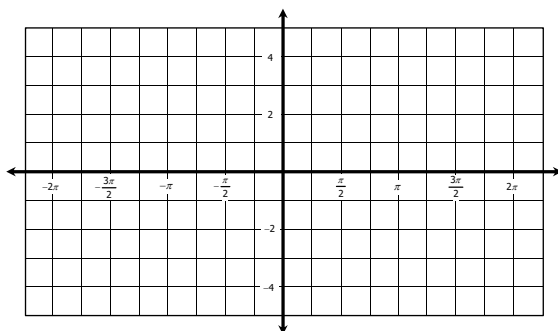
Period: _____

Phase Shift: _____

Vertical Shift: _____

Midline: _____

5. $y = 4 \cdot \cos\left(\theta - \frac{3\pi}{4}\right) - 1$



Amplitude: _____

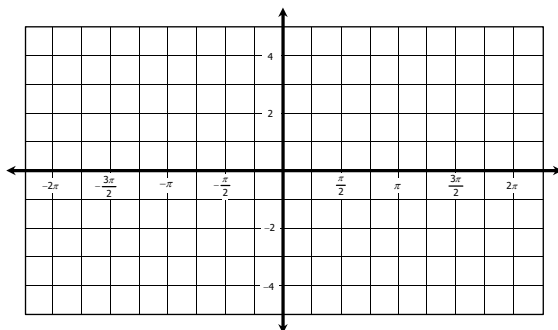
Period: _____

Phase Shift: _____

Vertical Shift: _____

Midline: _____

6. $y = 2 \cdot \tan\left(\theta + \frac{\pi}{4}\right) - 3$



Amplitude: _____

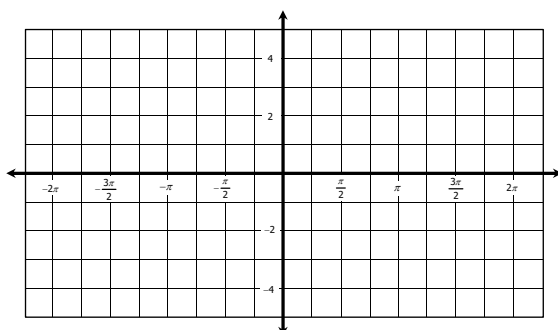
Period: _____

Phase Shift: _____

Vertical Shift: _____

Midline: _____

7. $y = \frac{5}{2} \cdot \sin(\theta + \pi) + 2$



Amplitude: _____

Period: _____

Phase Shift: _____

Vertical Shift: _____

Midline: _____