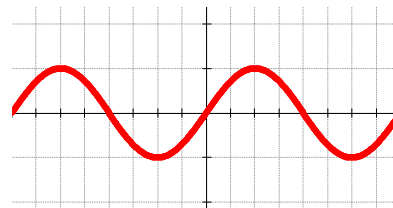
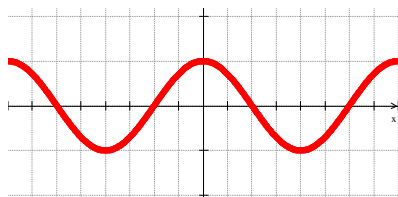


Write your questions and thoughts here!

RECALL:



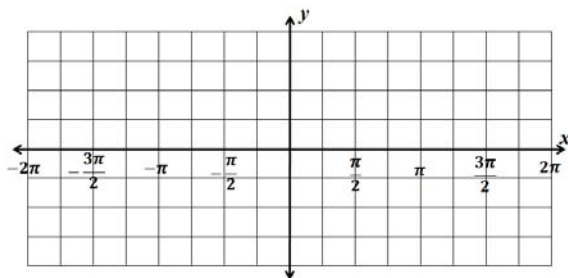
Phase Shift:

$$y = a \sin(b(x - \text{phase shift})) + k$$

1. $y = \cos\left(\frac{1}{2}\left(x + \frac{\pi}{4}\right)\right)$

Amp: _____ Period: _____

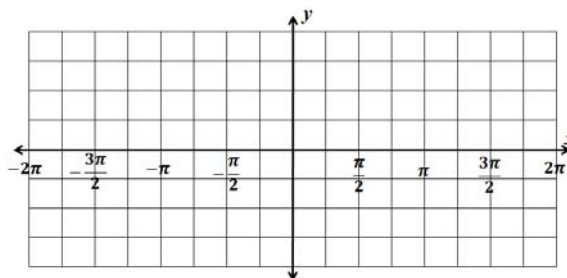
Phase Shift: _____



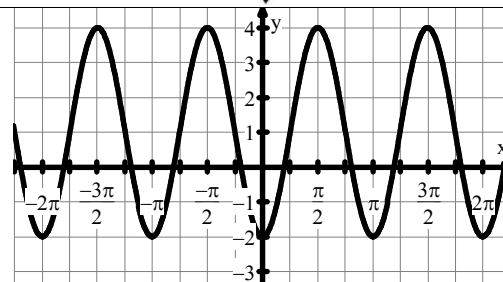
2. $y = -2 \sin(2x - \pi) - 1$

Amp: _____ Period: _____

Phase Shift: _____



3. Write the equation of the following sine curve. Use a positive leading coefficient a and the closest phase shift possible (left or right).



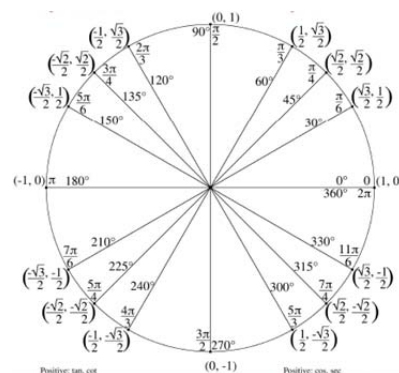
$f(\theta) = \tan \theta$

The Unit Circle

θ	$f(\theta)$
0	
$\frac{\pi}{4}$	
$\frac{\pi}{2}$	
$\frac{3\pi}{4}$	
π	

θ	$f(\theta)$
$\frac{5\pi}{4}$	
$\frac{3\pi}{2}$	
$\frac{7\pi}{4}$	
2π	

$\tan \theta = \frac{\text{opposite}}{\text{adjacent}} = \frac{\text{y}}{\text{x}}$

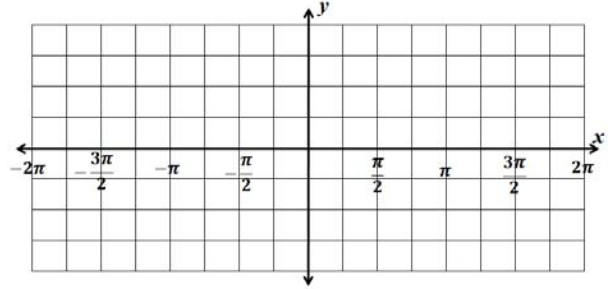


10.2 Phase Shift and Tangent

Write your questions and thoughts here!

Tangent Parent Function Graph

$$y = \tan x$$



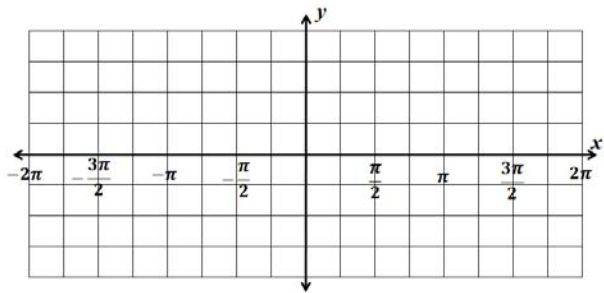
Standard equation:

$$y = a \tan(b(x - h)) + k$$

Period:

4. $y = \frac{1}{2} \tan(2x - \pi)$

Period:



Phase Shift:

Now summarize what you learned!

Skillz Review: Complex Fraction (Fraction in a fraction)

$\frac{\left(\frac{2}{5}\right)}{\left(\frac{3}{10}\right)} =$	$\frac{\left(\frac{1}{\sin x}\right)}{\left(\frac{1}{\cos x}\right)} =$	$\frac{\csc \theta}{\cot \theta} =$
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Skillz Review: Add/Subtract Fractions

$\frac{3}{5} + \frac{1}{2} =$	$\frac{1}{\cos x} + \frac{1}{5} =$	$\sin \theta - \frac{1}{\sin \theta} =$
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10.2 Practice – Phase Shift and Tangent

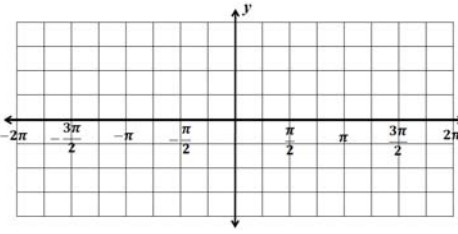
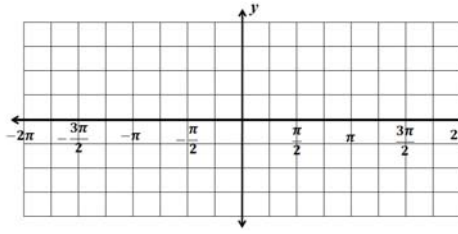
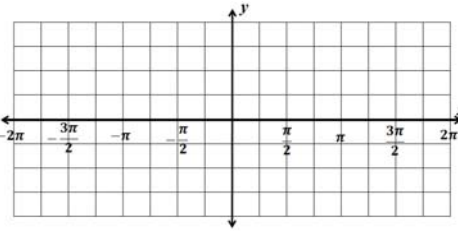
Name: _____

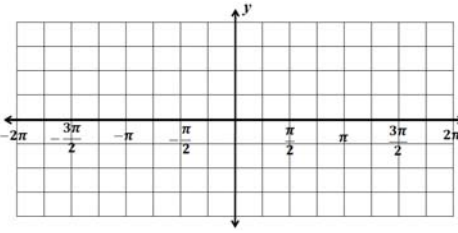
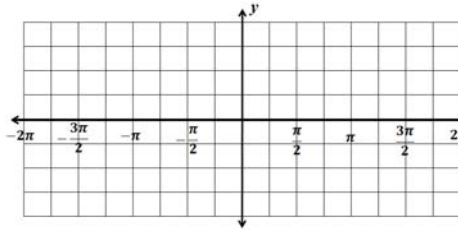
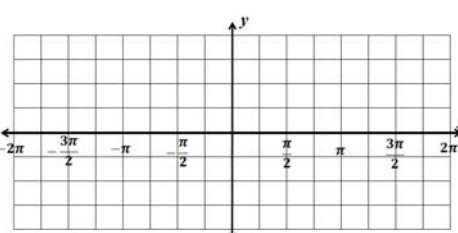
Pre-Calculus

For 1-3, identify the amplitude, period, phase shift and vertical shift of each function.

<p>1. $f(x) = 13 \sin\left(4\left(x + \frac{\pi}{11}\right)\right) - 7$ Amp: _____ Period: _____ Phase Shift: _____ Vertical Shift: _____</p>	<p>2. $f(\theta) = -25 \cos(7(\theta - 10)) + 3$ Amp: _____ Period: _____ Phase Shift: _____ Vertical Shift: _____</p>	<p>3. $f(\theta) = 4 - 9 \sin\left(2\left(\theta + \frac{2\pi}{7}\right)\right)$ Amp: _____ Period: _____ Phase Shift: _____ Vertical Shift: _____</p>
<p>4. $f(\theta) = -3 \cos\left(2\theta + \frac{\pi}{4}\right) - 10$ Amp: _____ Period: _____ Phase Shift: _____ Vertical Shift: _____</p>	<p>5. $f(\theta) = 2 \sin\left(\frac{\theta}{2} - \frac{\pi}{5}\right) - 5$ Amp: _____ Period: _____ Phase Shift: _____ Vertical Shift: _____</p>	<p>6. $f(x) = 6 \cos\left(3x + \frac{\pi}{6}\right) + 11$ Amp: _____ Period: _____ Phase Shift: _____ Vertical Shift: _____</p>

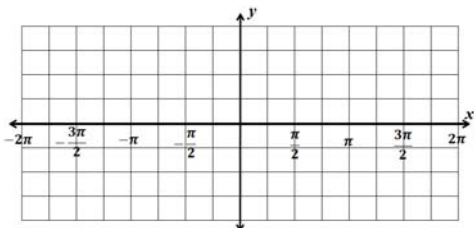
For 7-18, graph the trig function.

<p>7. $y = \sin\left(x + \frac{\pi}{4}\right)$ Amp Period P.S. V.S.</p> 	<p>8. $y = -\cos\left(x - \frac{\pi}{2}\right)$ Amp Period P.S. V.S.</p> 	<p>9. $y = 3 \cos\left(x - \frac{3\pi}{4}\right) - 1$ Amp Period P.S. V.S.</p> 
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<p>10. $y = 2 + \sin\left(2\left(x + \frac{\pi}{4}\right)\right)$ Amp Period P.S. V.S.</p> 	<p>11. $y = -\sin\left(\frac{1}{2}\left(x - \frac{\pi}{2}\right)\right) - 2$ Amp Period P.S. V.S.</p> 	<p>12. $y = 2 \cos(4(x - \pi)) - 1$ Amp Period P.S. V.S.</p> 
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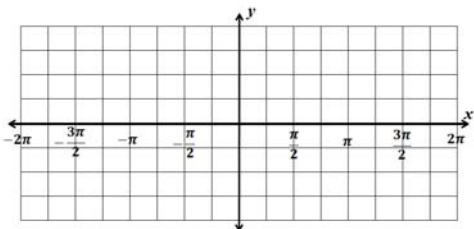
13. $y = \frac{1}{2} \sin\left(x - \frac{3\pi}{2}\right)$

Amp Period P.S. V.S.



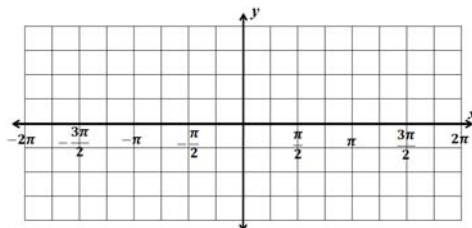
14. $y = -2 \sin(2x + \pi) + 1$

Amp Period P.S. V.S.



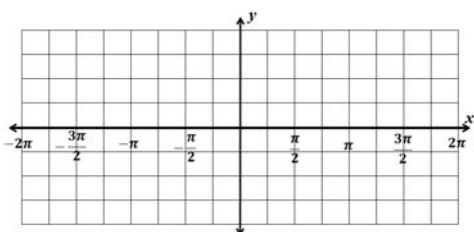
15. $y = \cos\left(2x - \frac{\pi}{2}\right)$

Amp Period P.S. V.S.



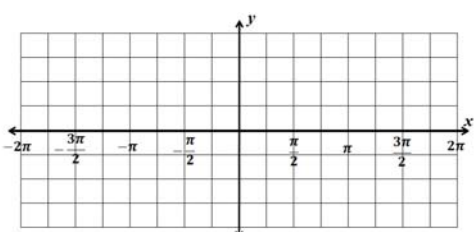
16. $y = -\frac{1}{2} \tan x$

Period P.S. V.S.



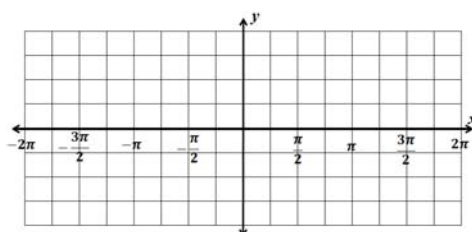
17. $y = 4 \tan\left(-\frac{1}{2}x\right) - 3$

Period P.S. V.S.



18. $y = \tan(2x - \pi) + 2$

Period P.S. V.S.



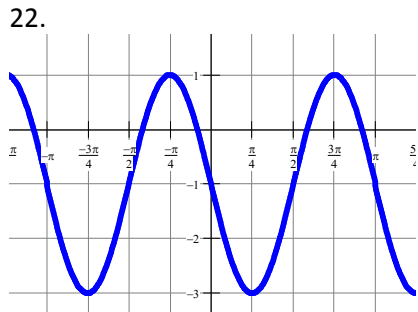
For 19 – 21, use the given information to create a sine function.

19.
Amplitude: 2
Period: $\frac{3\pi}{2}$
Phase Shift: left $\frac{5\pi}{9}$
Vertical Shift: down 14

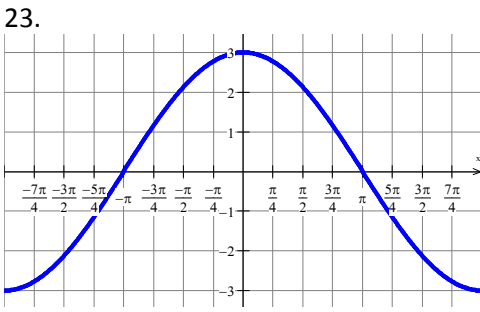
20.
Amplitude: 5
Period: $\frac{\pi}{6}$
Phase Shift: right $\frac{\pi}{24}$
Vertical Shift: up 8

21.
Amplitude: 1
Period: 6
Phase Shift: left $\frac{6\pi}{7}$
Vertical Shift: up 2

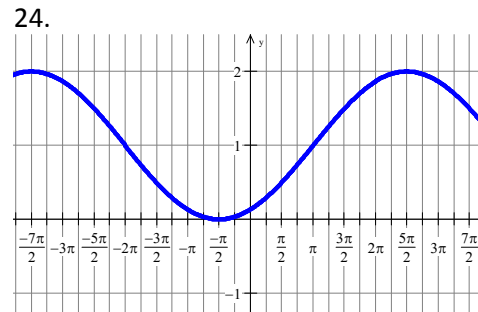
For 22-24, write the equation of the following sine curves. Use a positive leading coefficient a and the closest phase shift possible (left or right). For some problems, it may be equal to move left or right.



$y =$ _____



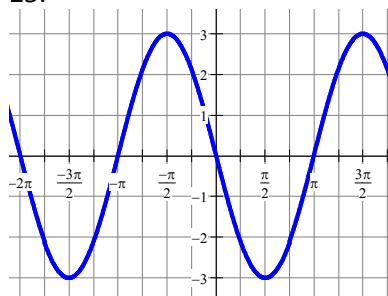
$y =$ _____



$y =$ _____

For 25-27, write a sine AND cosine function for the curve. Use a positive leading coefficient a and the closest phase shift possible (left or right). For some problems, it may equal to move left or right.

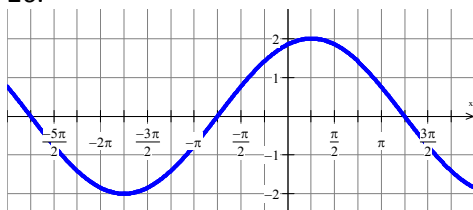
25.



sine: $y =$ _____

cosine: $y =$ _____

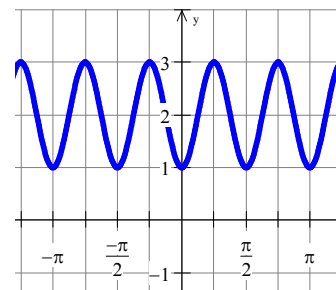
26.



sine: $y =$ _____

cosine: $y =$ _____

27.



sine: $y =$ _____

cosine: $y =$ _____

10.2 Application and Extension

1. Create a **cosine** function based off the following information:

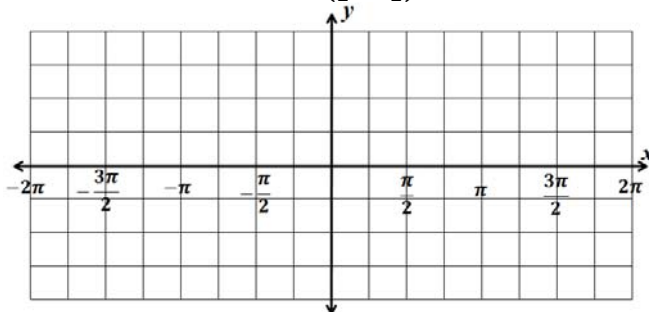
Amplitude: 8

Period: $\frac{2\pi}{3}$

Phase Shift: right $\frac{\pi}{21}$

Vertical Shift: up 5

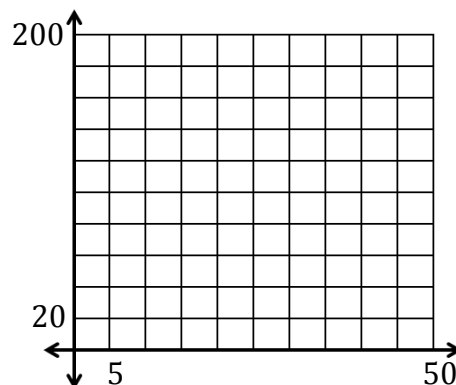
2. Graph $f(\theta) = -3 \sin\left(\frac{\theta}{2} + \frac{\pi}{2}\right) + 1$



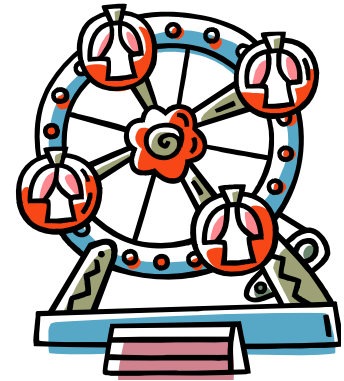
1. You are standing 300 feet from the base of a 200 foot cliff. Your friend is rappelling down the cliff.
 - a. Write a model (using degrees) that gives your friend's distance d (in feet) **from the top** of the cliff as a function of the angle of elevation θ .

b. Using the graph on the right, label the axes and graph the function from part a.

c. If the angle of elevation between you and your friend is 9° , how far from the top of the cliff is your friend?



2. Suppose you are riding a Ferris wheel. After everyone is loaded, the wheel starts to turn and the ride lasts 180 seconds. Your height h (in feet) above the ground at any time t (in seconds) can be modeled by the equation $h(t) = 85 \sin \left[\frac{\pi}{20}(t - 6) \right] + 90$. You do not need a calculator for any question except the last two.



- a. What is the period?
- b. What does the period represent?
- c. What is the frequency?
- d. What does the frequency represent?
- e. What is your maximum height?
- f. What is your minimum height?
- g. How many circles will the Ferris Wheel make during the ride?



- h. How high are you when the ride begins? (Remember, you are not at ground level because the people in line behind you had to get on the ride.)



- i. What is your height when the ride stops?