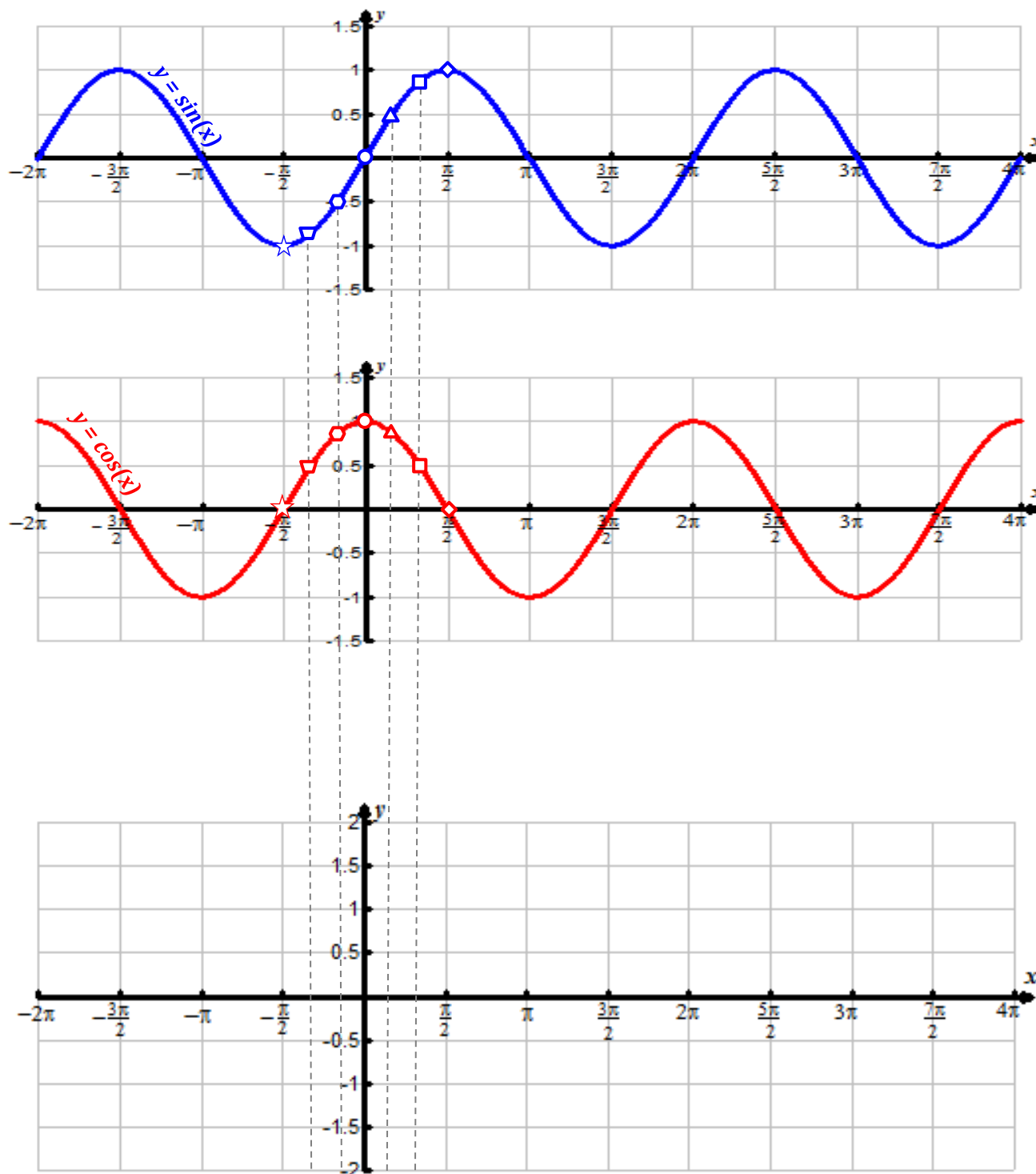


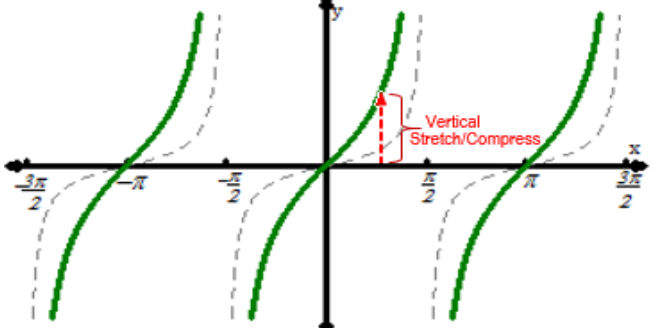
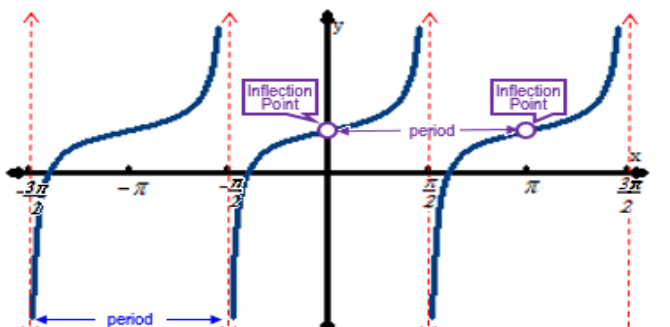
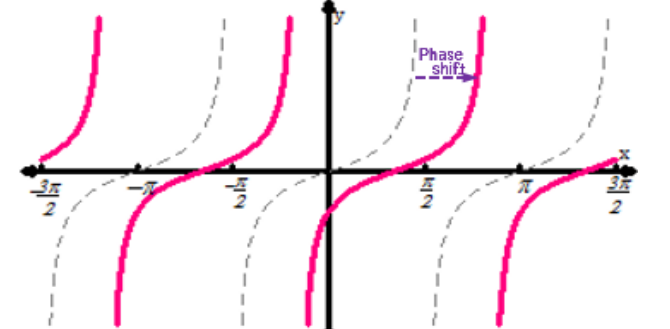
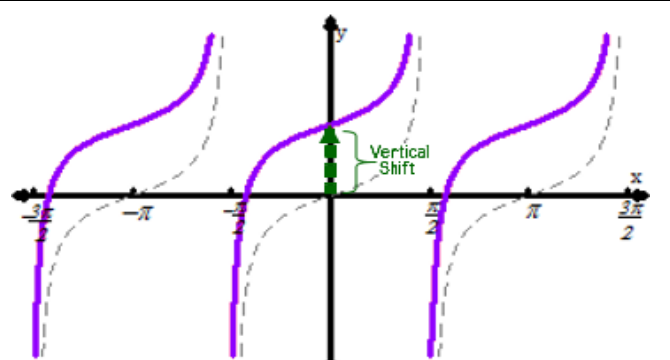
Recall, $\sin(\theta) = \frac{\text{opp}}{\text{hyp}}$, $\cos(\theta) = \frac{\text{adj}}{\text{hyp}}$, and $\tan(\theta) = \frac{\text{opp}}{\text{adj}}$. Use this to show:

$$\frac{\sin(\theta)}{\cos(\theta)} = \quad = \tan(\theta)$$

Use the above relationship to help you graph $y = \tan(x)$.



A tangent graph is commonly described by 4 components.

Parts of a Tangent and Cotangent Graph	Visual
Vertical Stretch/Compress: Tangent and Cotangent do not have an amplitude because their range is all real numbers. However, they can be transformed by being vertically stretched or compressed.	
Period: The period of the graph is the horizontal distance of one complete cycle. $\text{Period} = (\text{Asymptote } X) - (\text{Previous Asymptote } X)$ $\text{Period} = (\text{Inflection } X) - (\text{Previous Inflection } X)$	
Phase Shift: The amount the graph is shifted right/ left $\text{Phase Shift} = \text{Inflection } X$	
Vertical Shift: The amount the graph is shifted up/down $\text{Vertical Shift} = \text{Inflection } Y$	

$$y = a \cdot \tan\left(\frac{\pi}{b}(x - c)\right) + d$$

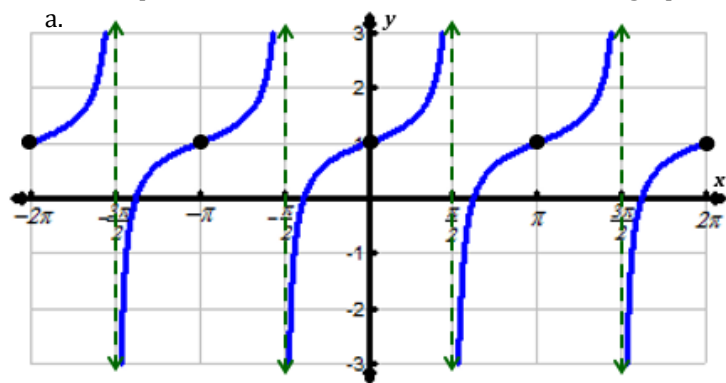
a = Vertical Stretch/Compress

$\frac{\pi}{b} = \text{Period}$

c = Phase Shift

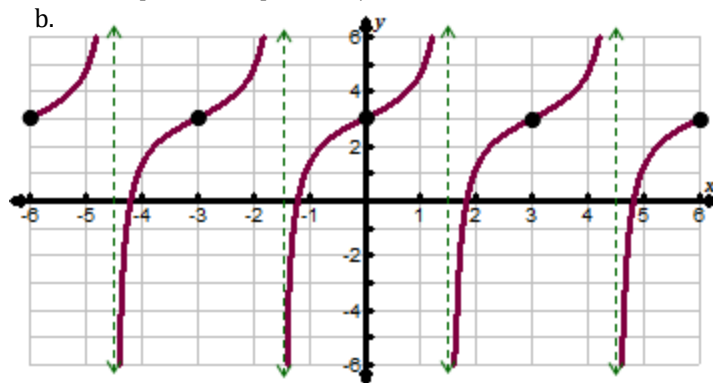
d = Vertical Shift

1. Find the parameters of each **TANGENT/COTANGENT** graph and determine a possible equation. (assume there is no vertical stretch)



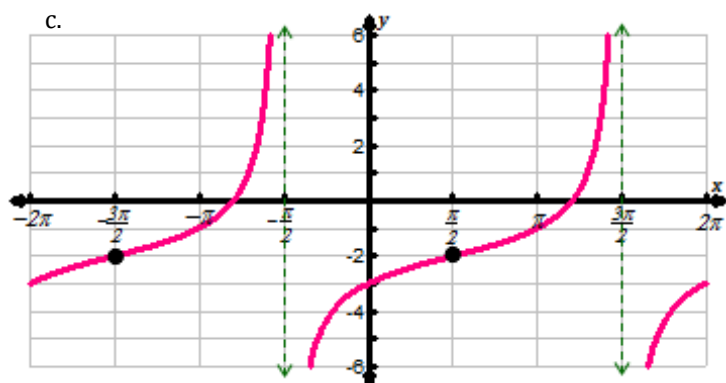
Period = Phase = Vertical =
 Shift Shift

Possible
Equation:
(Using Tangent)



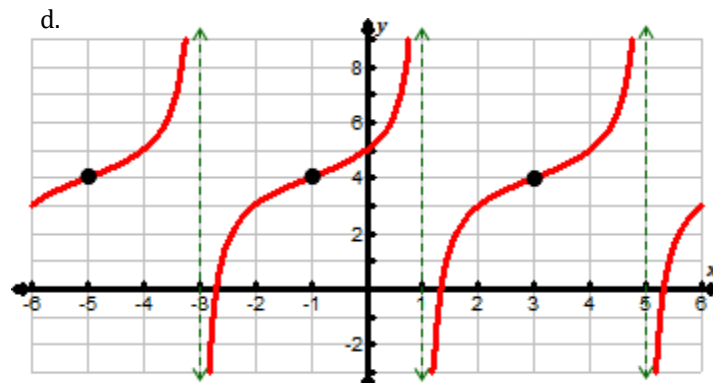
Period = Phase = Vertical =
 Shift Shift

Possible
Equation:
(Using Tangent)



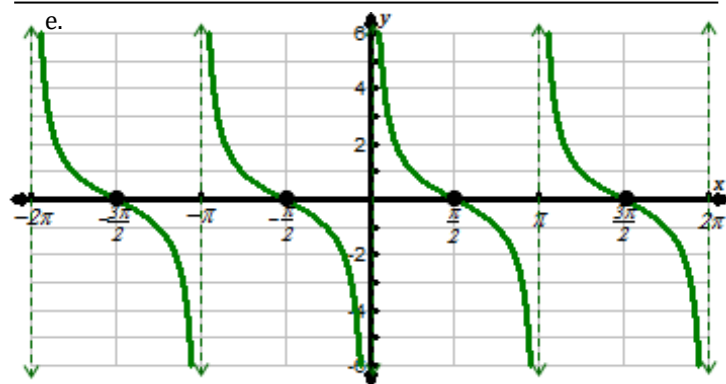
Period = Phase = Vertical =
 Shift Shift

Possible
Equation:
(Using Tangent)



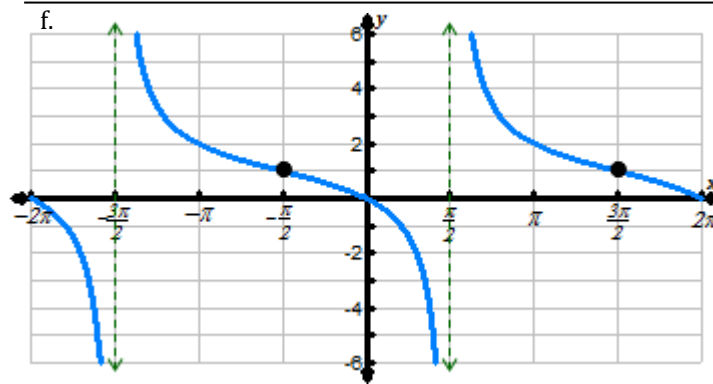
Period = Phase = Vertical =
 Shift Shift

Possible
Equation:
(Using Tangent)



Period = Phase = Vertical =
 Shift Shift

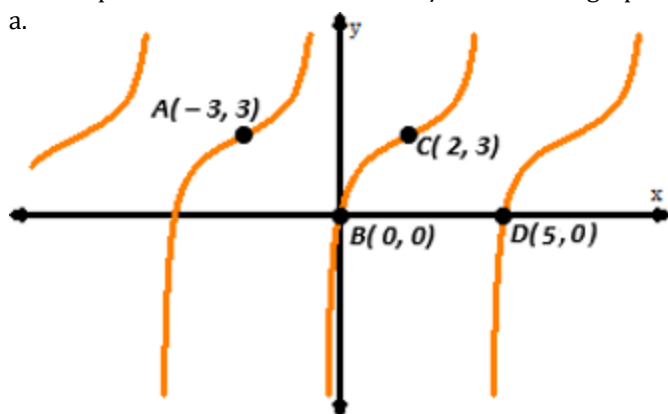
Possible
Equation:
(Using Cotangent)



Period = Phase = Vertical =
 Shift Shift

Possible
Equation:
(Using Cotangent)

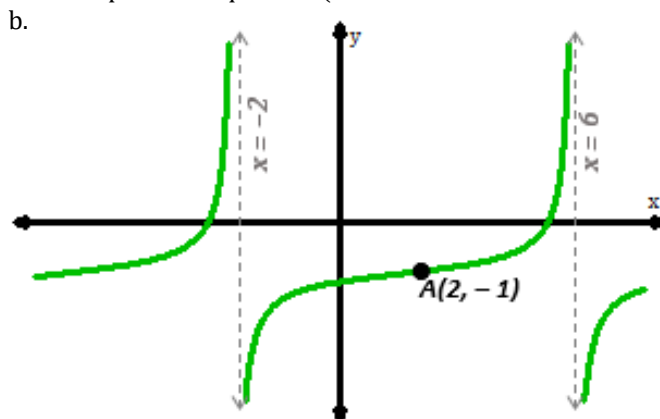
2. Find the parameters of each **TANGENT/COTANGENT** graph and determine a possible equation. (assume there is no vertical stretch)



Period = Phase = Vertical =
 Shift Shift

Possible
Equation:

(Using Tangent)



Period = Phase = Vertical =
 Shift Shift

Possible
Equation:

(Using Tangent)

3. Find the requested **TANGENT/COTANGENT** parameters based on the following equations.

a. $y = 6 \tan(4(x + 2)) - 1$

Vertical =
Stretch/Compress

Period =

Phase =
Shift

Vertical =
Shift

b. $y = \pi \cot\left(\frac{\pi}{3}(x - 5)\right) + 4$

Vertical =
Stretch/Compress

Period =

Phase =
Shift

Vertical =
Shift

c. $y = 4 \tan(4x - 12) - 5$

Vertical =
Stretch/Compress

Period =

Phase =
Shift

Vertical =
Shift

d. $y = -2 \tan(\pi x + 3) + 6$

Vertical =
Stretch/Compress

Period =

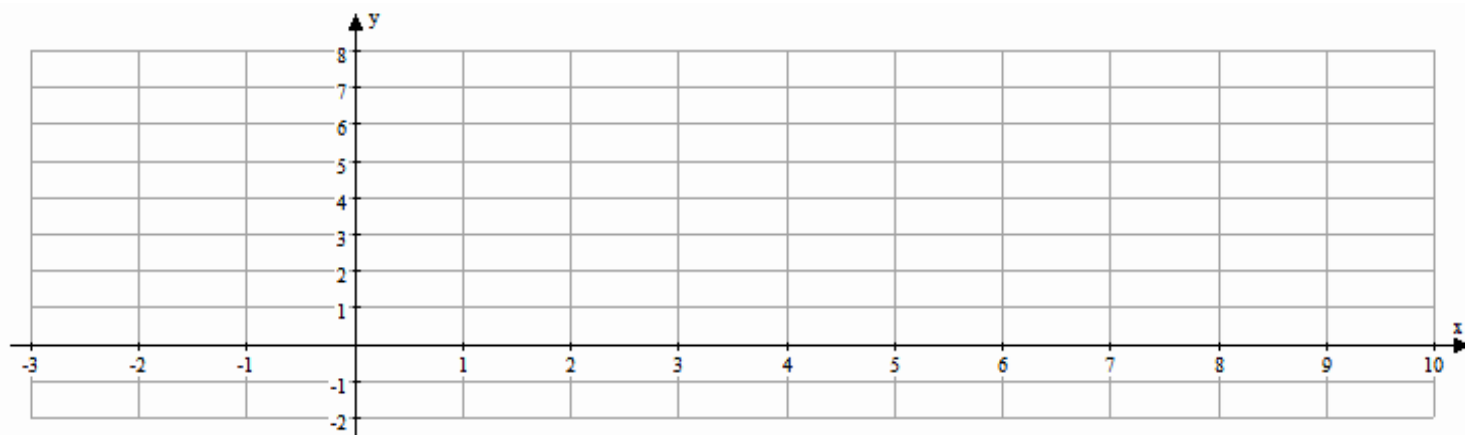
Phase =
Shift

Vertical =
Shift

4. Graph the following equation.

a.

$$y = \tan\left(\frac{\pi}{4}(x-1)\right) + 4$$



b. $y = \cot\left(\frac{1}{2}\left(x - \frac{\pi}{2}\right)\right) + 3$

