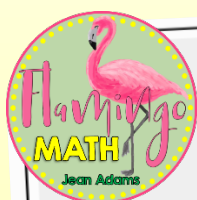


Precalculus Honors

Graphs of Other Trigonometric Functions



Phase Shift and Standard Form Equations

KEY POINTS METHOD:

$$y = 2 \csc\left(x - \frac{\pi}{2}\right)$$

Identify values for A, B, C, and D

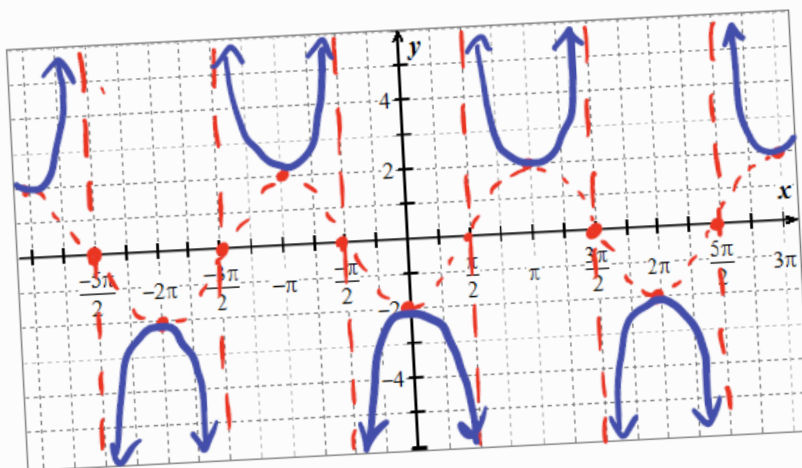
$$A=2, B=1, C=\frac{\pi}{2}$$

Find $\frac{C}{B}$ to start $\frac{\pi}{2}$

Find $\frac{2\pi}{B}$ for one cycle 2π

$\frac{C}{B} + \frac{2\pi}{B}$ to stop

$$\frac{\pi}{2} + 2\pi = \frac{5\pi}{2}$$



Completely Editable

4.7

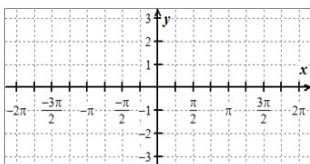
Lesson 7: Graphs of Other Trigonometric Functions

The graphs of tangent, cotangent, secant, and cosecant functions are also periodic. However, tangent and cotangent will have a shorter cycle (period) than the other four functions. We just need to define the graph over some interval with a length π .

The Graph of $y = \tan x$

The graph of the tangent function will complete one full cycle in the interval of $[0, \pi]$ so the **period** of $y = \tan \theta$ is π . However, there is a vertical asymptote at $\theta = \frac{\pi}{2}$. On what continuous interval can the entire behavior of the function be shown?

$$Y = A \tan (Bx - C)$$

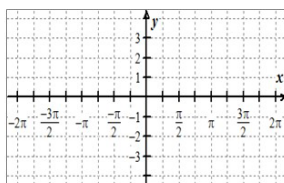


Characteristics of the Tangent Function

Domain	Range
x-intercepts	y-intercept
Odd Symmetry	Asymptotes

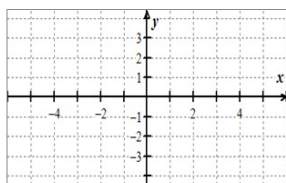
EX #2: Use transformations, graph each function, state period and show all asymptotes.

A. Graph $y = -2 \tan \left(\frac{\pi}{2} x \right)$



Period: _____

B. Graph $y = \tan \frac{\pi}{4} x + 2$



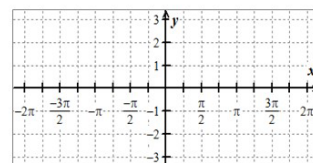
Period: _____

Graphing Cotangent Functions

The Graph of $y = \cot x$

EX #3: The graph of the cotangent function will also complete one full cycle in the interval of $[0, \pi]$ so the **period** of $y = \cot \theta$ is π . Since vertical asymptotes occur at $\theta = 0$ and $\theta = \pi$, will this interval show the complete function behavior?

$$Y = A \cot (Bx - C)$$

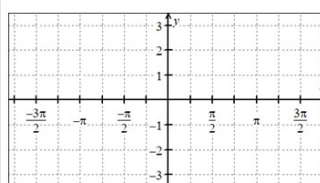


Characteristics of the Cotangent Function

Domain	Range
x-intercepts	y-intercept
Odd Symmetry	Asymptotes

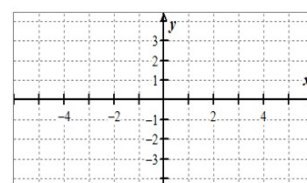
EX #4: Use transformations, graph each function, state period and show all asymptotes.

A. Graph $y = \cot 2x$



Period: _____

B. Graph $y = -\cot \frac{\pi}{2} x + 1$



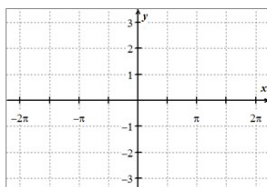
Period: _____

Graphing Secant and Cosecant Functions

The cosecant and secant functions are **reciprocal functions**. We can use this concept as an aid in graphing. Each reciprocal function behaves as a sort of **skeleton** for the graph in question.

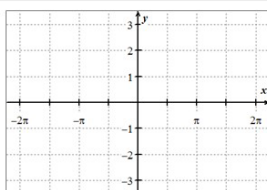
$$y = \csc x$$

Reciprocal	Domain
Range	Asymptotes



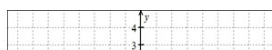
$$y = \sec x$$

Reciprocal	Domain
Range	Asymptotes

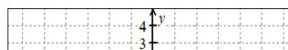


EX #5: Use transformations, graph each function, its reciprocal, state period, and show all asymptotes.

A. Graph $y = 2 \csc \left(\frac{\pi}{2} x \right)$



B. Graph $y = -2 \sec 3x$



Phase Shift and Standard Form Equations

KEY POINTS METHOD:

$$y = 2 \csc \left(x - \frac{\pi}{2} \right)$$

Identify values for A, B, C, and D

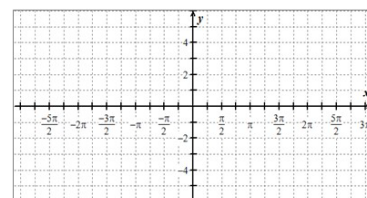
Find $\frac{C}{B}$ to start

Find $\frac{2\pi}{B}$ for one cycle

$\frac{C}{B} + \frac{2\pi}{B}$ to stop

Create four subintervals

Graph the reciprocal function



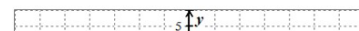
TRANSFORMATIONS METHOD:

$$y = -\sec(2x - \pi) - 1$$

Factor out B-value

$$y = -\sec \left[2 \left(x - \frac{\pi}{2} \right) \right] - 1$$

Find D for vertical shift



NOTES

Reciprocal: _____

Reciprocal: _____

Period: _____

Period: _____

4.7

Graphs of Other
Trigonometric Functions
Homework

Name _____

Date _____ Period _____

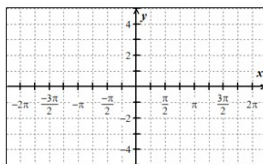
Problems 1-4, Refer to the parent functions to answer each of the following.

1. For what values of x in the interval $[-2\pi, 2\pi]$ does $\csc x = 1$? What about $\csc x = -1$?
2. For what values of x in the interval $[-2\pi, 2\pi]$ does $y = \sec x$ have vertical asymptotes?

3. Name the x -intercepts for $y = \tan x$.
4. Name the x -intercepts for $y = \cot x$.

Problems 5-16, Sketch the graph of the function. Include two full periods.

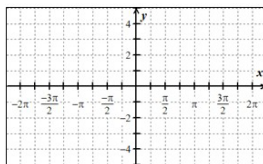
5. $y = -\sec x$

 $\frac{C}{B}$: $\frac{2\pi}{B}$:

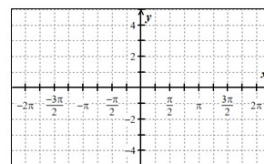
6. $y = -\tan(x + \pi)$

Left asymptote:

Right asymptote:



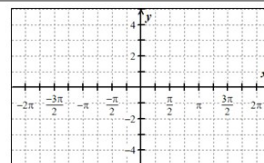
7. $y = \csc(x - \pi)$

 $\frac{C}{B}$: $\frac{2\pi}{B}$:

8. $y = -2 \cot(x - \pi)$

Left asymptote:

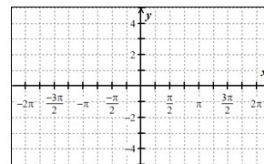
Right asymptote:



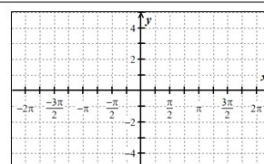
9. $y = 2 \tan\left(\frac{x}{2}\right)$

Left asymptote:

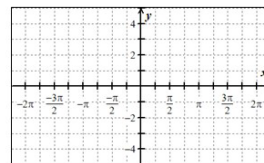
Right asymptote:



10. $y = 2 \sec(x - \pi)$

 $\frac{C}{B}$: $\frac{2\pi}{B}$:

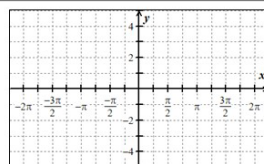
11. $y = 2 \csc\left(x + \frac{\pi}{4}\right)$

 $\frac{C}{B}$: $\frac{2\pi}{B}$:

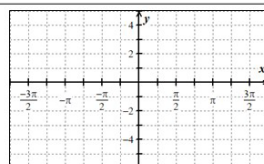
12. $y = -\tan\left(\frac{1}{2}x\right)$

Left asymptote:

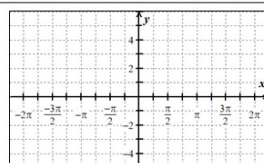
Right asymptote:



13. $y = 2 \sec(2x) - 1$

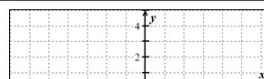
 $\frac{C}{B}$: $\frac{2\pi}{B}$:

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

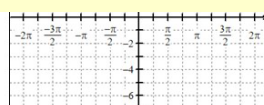
 $\frac{C}{B}$: $\frac{2\pi}{B}$:

15. $y = -2 \cot(2x)$

Left asymptote:



Practice Sets

 $\frac{2\pi}{B}$:

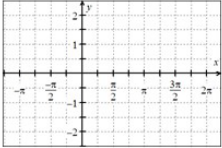
Lesson Warm-Ups

Name _____ Date _____ Period _____

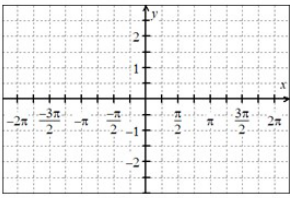
Lesson 4.7 - Graphs of Other Trigonometric Functions Warm-Up # I

1. State the period and amplitude.
 $y = 3 \sec\left(\frac{1}{2}x - \pi\right)$

2. Sketch two cycles of the graph, clearly label the asymptotes and the intercepts.
 $y = \tan\left(x - \frac{\pi}{2}\right)$



3. Sketch the graph of $y = -2 \sec(2x)$

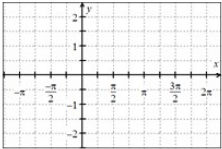


Name _____ Date _____

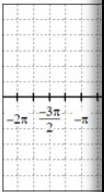
Lesson 4.7 - Graphs of Other Trigonometric Functions

1. State the period and amplitude.
 $y = 3 \csc\left(\frac{1}{2}x + \pi\right)$

2. Sketch two cycles of the graph, clearly label the asymptotes and the intercepts.
 $y = \cot(x - \pi)$



3. Sketch the graph of $y = 2 \sec(3x - \pi)$



4.7 Graphs of Other Trig Functions Form A

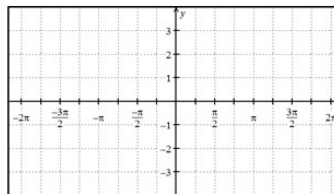
Name _____
 Date _____ Period _____

1. State the period and the amplitude.
 $y = 2 \sec(3x - \pi)$

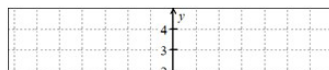
Amplitude:

Period:

2. Sketch two cycles of the graph, clearly label the asymptotes and the intercepts.
 $y = \cot\left(x - \frac{\pi}{2}\right)$



3. Sketch the graph of $y = 2 \sec(2x)$



4.7 Graphs of Other Trig Functions Form B

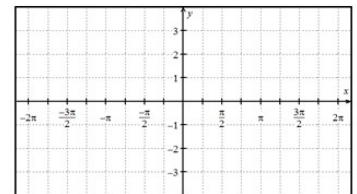
Name _____
 Date _____ Period _____

1. State the period and the amplitude.
 $y = 2 \csc(2x + \pi)$

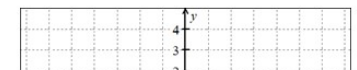
Amplitude:

Period:

2. Sketch two cycles of the graph, clearly label the asymptotes and the intercepts.
 $y = \tan(x - \pi)$



3. Sketch the graph of $y = -2 \csc(2x)$



Daily Lesson Quiz

Grade: _____

Grade: _____