

Graphing the other Trig Functions

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Announcements

- 1 Homework in Canvas.
- 2 Exam Corrections due in 1 week.
- 3 Office hours today: 10am - 11am.

The Graphs of the other Trig Functions

Let's start class with some boring tables:

The Graphs of the other Trig Functions

x	$\tan(x)$	$\cot(x)$	$\sec(x)$	$\csc(x)$
$-\pi$				
$-5\pi/6$				
$-3\pi/4$				
$-2\pi/3$				
$-\pi/2$				
$-\pi/3$				
$-\pi/4$				
$-\pi/6$				
0				
$\pi/6$				
$\pi/4$				
$\pi/3$				
$\pi/2$				
$2\pi/3$				
$3\pi/4$				
$5\pi/6$				
π				

Graphing variations of tangent: $A \tan(Bx - C) + D$

FEATURES OF THE GRAPH OF $Y = A \tan(Bx - C) + D$

- The stretching factor is $|A|$.
- The period is $\frac{\pi}{|B|}$.
- The domain is $x \neq \frac{C}{B} + \frac{\pi}{|B|}k$, where k is an integer.
- The range is $(-\infty, \infty)$.
- The vertical asymptotes occur at $x = \frac{C}{B} + \frac{\pi}{2|B|}k$, where k is an odd integer.
- There is no amplitude.

HOW TO

Given the function $y = A \tan(Bx - C) + D$, sketch the graph of one period.

1. Express the function given in the form $y = A \tan(Bx - C) + D$.
2. Identify the stretching/compressing factor, $|A|$.
3. Identify B and determine the period, $P = \frac{\pi}{|B|}$.
4. Identify C and determine the phase shift, $\frac{C}{B}$.
5. Draw the graph of $y = A \tan(Bx)$ shifted to the right by $\frac{C}{B}$ and up by D .
6. Sketch the vertical asymptotes, which occur at $x = \frac{C}{B} + \frac{\pi}{2|B|}k$, where k is an odd integer.
7. Plot any three reference points and draw the graph through these points.

Graphing variations of secant: $A \sec(Bx - C) + D$

FEATURES OF THE GRAPH OF $Y = A \sec(Bx - C) + D$

- The stretching factor is $|A|$.
- The period is $\frac{2\pi}{|B|}$.
- The domain is $x \neq \frac{C}{B} + \frac{\pi}{2|B|}k$, where k is an odd integer.
- The range is $(-\infty, -|A| + D] \cup [|A| + D, \infty)$.
- The vertical asymptotes occur at $x = \frac{C}{B} + \frac{\pi}{2|B|}k$, where k is an odd integer.
- There is no amplitude.
- $y = A \sec(Bx - C) + D$ is an even function because cosine is an even function.

HOW TO

Given a function of the form $f(x) = A \sec(Bx - C) + D$, graph one period.

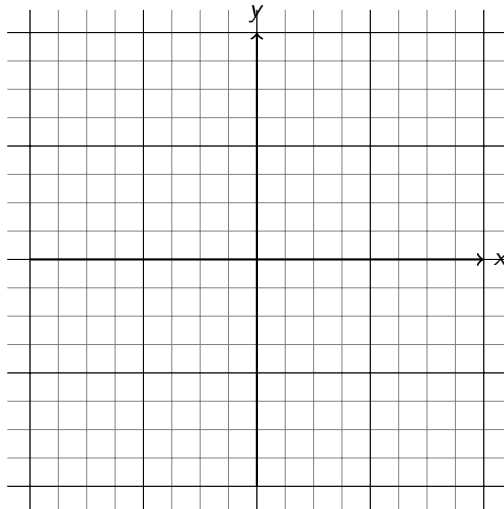
1. Express the function given in the form $y = A \sec(Bx - C) + D$.
2. Identify the stretching/compressing factor, $|A|$.
3. Identify B and determine the period, $\frac{2\pi}{|B|}$.
4. Identify C and determine the phase shift, $\frac{C}{B}$.
5. Draw the graph of $y = A \sec(Bx)$, but shift it to the right by $\frac{C}{B}$ and up by D .
6. Sketch the vertical asymptotes, which occur at $x = \frac{C}{B} + \frac{\pi}{2|B|}k$, where k is an odd integer.

Example

Plot one period of the function

$$y = 2 \tan\left(\frac{\pi x}{4} - \frac{\pi}{2}\right) + 2$$

Example



Example

Plot one period of the function

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

Example

