

Warm-up!

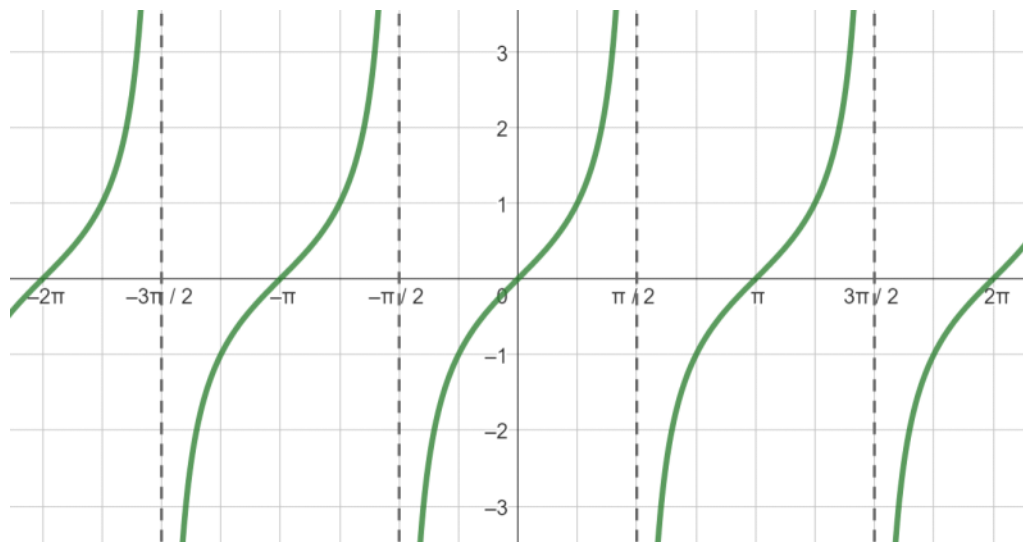
1. List 4 values of θ for which $\tan(\theta)$ is undefined.
2. List 4 values of θ for which $\tan(\theta) = 0$.
3. List 4 values of θ for which $\csc(\theta)$ is undefined.
4. List 4 values of θ for which $\csc(\theta) = 0$.

Periodic Graphs Day 6:

- (3.8+3.11) Graphs of tangent and cotangent
- (3.11) Graphs of secant and cosecant

HW: The Other Four Trig Graphs

Parent Function: $y = \tan x$



Domain:

Range:

Period:

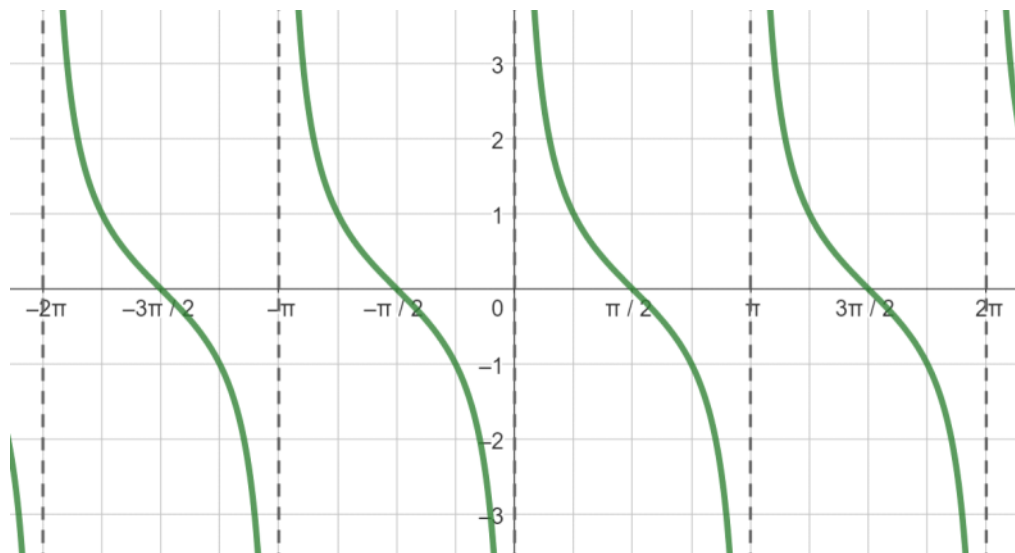
Between consecutive asymptotes, this function is:

Points of Inflection:

Even or Odd:

Mental check we can use to make sure we got the zeros and asymptotes correct:

Parent Function: $y = \cot x$



Domain:

Range:

Period:

Between consecutive asymptotes, this function is:

Points of Inflection:

Even or Odd:

Mental check we can use to make sure we got the zeros and asymptotes correct:

Transforming the Functions

$$y = a \tan(b(x + c)) + d$$

a

b

c

d

Graphing

For tangent, the phase shift helps you find a point of inflection.

For cotangent, the phase shift helps you find a vertical asymptote.

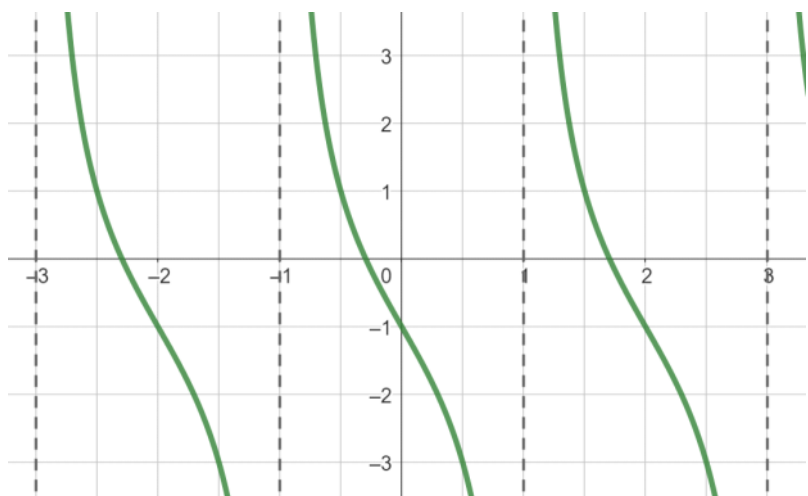
Roughly sketch $y = \tan\left(\frac{1}{8}(x + \pi)\right) - 3$

Roughly sketch $y = 4 \cot(\pi(x - 3)) + 2$

You try: Roughly Sketch $y = \tan\left(\frac{\pi}{4}(x + 1)\right) + 5$

To the right is a graph of $y = f(x)$. Which is a correct equation for this function?

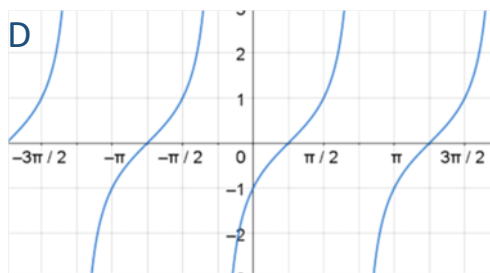
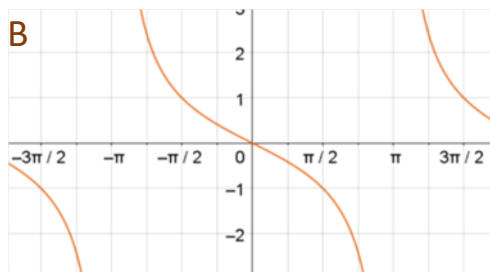
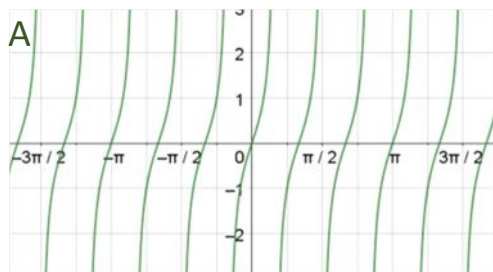
- A) $f(x) = 2 \cot\left(\frac{\pi}{2}(x - 1)\right) + 1$
- B) $f(x) = 2 \cot(\pi(x - 1)) - 1$
- C) $f(x) = 2 \cot\left(\frac{\pi}{2}(x + 1)\right) - 1$
- D) $f(x) = 2 \cot(\pi(x + 1)) + 1$



At what x -values does this function have vertical asymptotes?

What is the domain of this function?

Match each of the following functions with the letter corresponding to the correct graph



$$f(x) = \tan(3x)$$

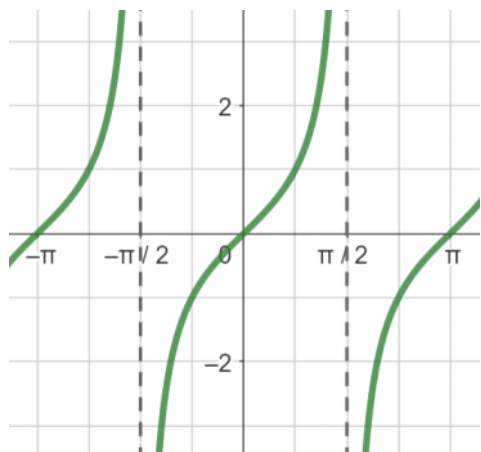
$$g(x) = \tan\left(x - \frac{\pi}{4}\right)$$

$$h(x) = \tan(2x + 2\pi)$$

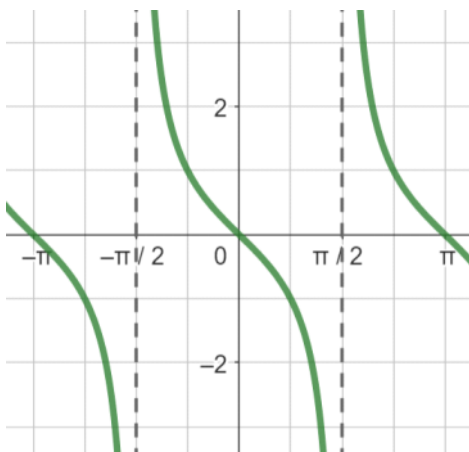
$$j(x) = \tan\left(-\frac{x}{2}\right)$$

Reflecting Tangent

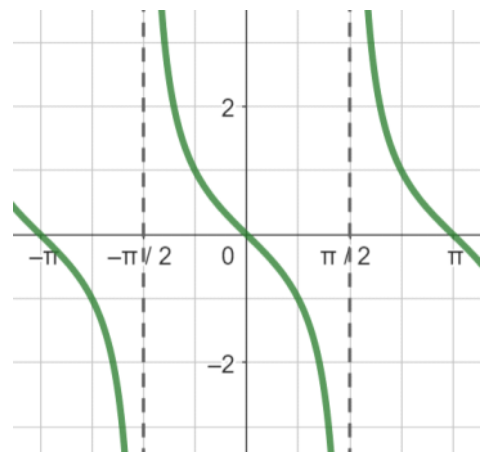
$$y = \tan(x)$$



$$y = -\tan(x)$$



$$y = \tan(-x)$$



Let's make sure we can find asymptotes

Find the vertical asymptotes for $f(x) = 3 \cot\left(\frac{1}{4}(x - \pi)\right) + 1$

You try finding asymptotes

Find the vertical asymptotes for $f(x) = -2 \tan \left(2\pi \left(x + \frac{1}{4} \right) \right) - 3$

Which of the following are vertical asymptotes of the given function?

Let $f(x) = 3 \tan\left(\frac{1}{4}(x - \pi)\right) + 1$

$x = \pi$

$x = -\frac{\pi}{2}$

$x = 4\pi$

$x = -\pi$

$x = \frac{3\pi}{2}$

$x = 3\pi$

$x = 6\pi$

$x = -5\pi$

Graphing Secant

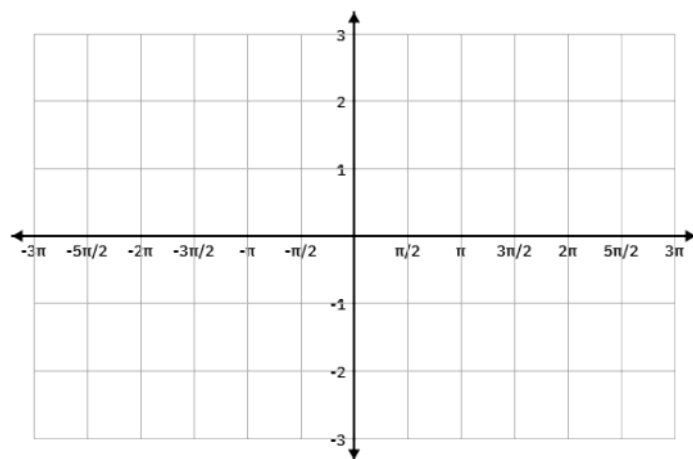
- 1) Pretend it is the reciprocal function
- 2) Put vertical asymptotes at the midline points
- 3) Put U shapes at the relative maxima and relative minima

Domain:

Range:

Period:

Even or Odd:



Mental check we can use to make sure we got the asymptotes correct:

Graphing Cosecant

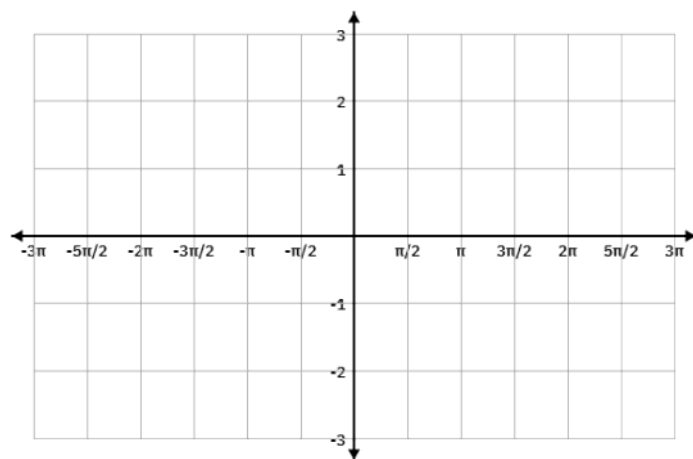
- 1) Pretend it is the reciprocal function
- 2) Put vertical asymptotes at the midline points
- 3) Put U shapes at the relative maxima and relative minima

Domain:

Range:

Period:

Even or Odd:



Mental check we can use to make sure we got the asymptotes correct:

Roughly sketch $y = 3 \csc \left(2 \left(x + \frac{\pi}{4} \right) \right) - 1$

The only things I will ask you about with secant and cosecant graphs

1) Domain/Asymptotes

2) Range

$$f(x) = 2 \sec\left(\frac{\pi}{4}(x - 1)\right) - 5$$

Find the range

Find the equations of four vertical asymptotes

$$g(x) = -3 \csc(x + \pi) + 6$$

Find the range

Find the equations of four vertical asymptotes