Use this Rational Function: $y = \frac{x+1}{x^2-9} = \frac{x+1}{(x+3)(x-3)}$

Find the Vertical Asymptotes
zeros of the denominator

$x = \pm 3$

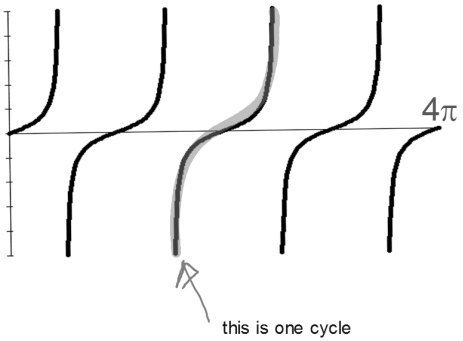
Find the x-intercepts:
zeros of the numerator.

$x = -1$

Sec 13-6: The Tangent Function

Graph the function y=Tanx

Use this Window: x:[0,4π] y:[-10, 10]



What is the period of
the Tangent Function?

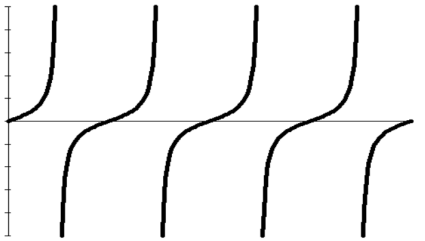
there are 4 cycles from 0 to 4π

$\text{period} = \frac{4\pi}{4} = \pi$

Why does the graph of

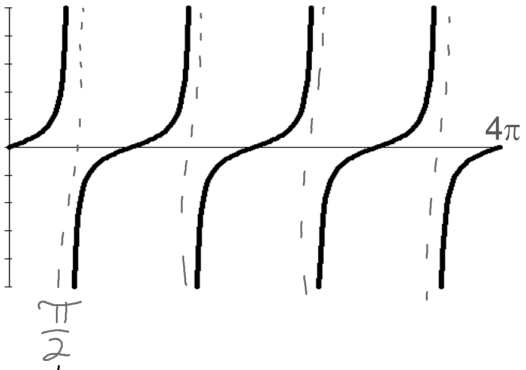
y = Tanθ look like this?

$\text{Tan}\theta = \frac{y}{x}$



When y = 0
Tanθ = 0 and there is an x-intercept

When x = 0
Tanθ is undefined and there is a Vertical Asymptote



y = Tanx

What are the Vertical Asymtpotes?

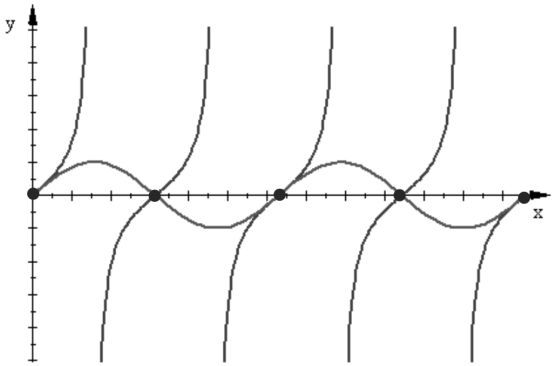
$\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \frac{7\pi}{2}$

What are the x-intercepts?

$0, \pi, 2\pi, 3\pi, 4\pi \ldots$

VA occur when x is zero and on the unit circle the first time x is zero is the positive y-axis. Since the period of Tangent is π you can add π to the first VA to get the second one then keep adding π to get the remaining VA.

Leave Y_1 = Tanx. Graph Y_2 = Sinx.

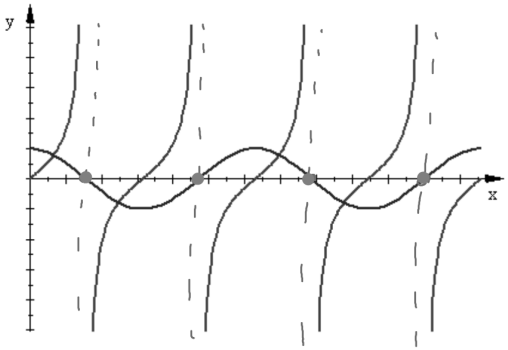


How is the graph of Tanx related to the graph of Sinx?

Tanx is zero whenever Sinx is zero.

In other words, Tanx has x-intercepts where ever Sinx has x-intercepts.

Leave Y_1 = Tanx. Graph Y_2 = Cosx.



How is the graph of Tanθ related to the graph of Cosθ?

Tanθ has a VA whenever Cosθ is zero.

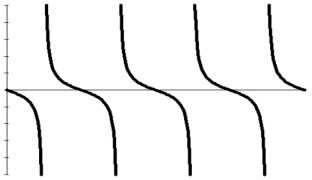
$$\text{Tan}\theta = \frac{y}{x} = \frac{\text{Sin}\theta}{\text{Cos}\theta}$$

$$y = aTan(bx) = a\left(\frac{Sin(bx)}{Cos(bx)}\right)$$

a: If a<0 there is an x-axis reflection

b: The period of Tanbx = $\frac{\pi}{b}$

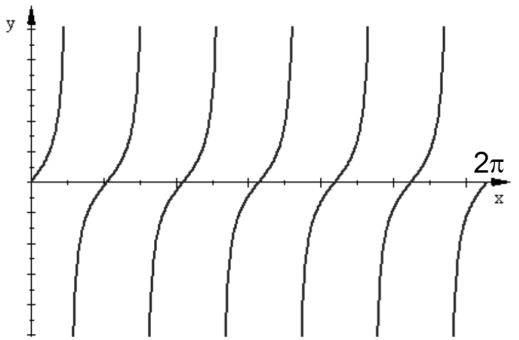
$b = \frac{\pi}{\text{period}}$



VA occur wherever Cos(bx)=0

x-int occur wherever Sin(bx)=0

A Tangent function is graphed in the window 0 to 2π.



1. What is the period?

$\frac{2\pi}{6} = \frac{\pi}{3} \rightarrow b = \frac{\pi}{\frac{\pi}{3}} = 3$

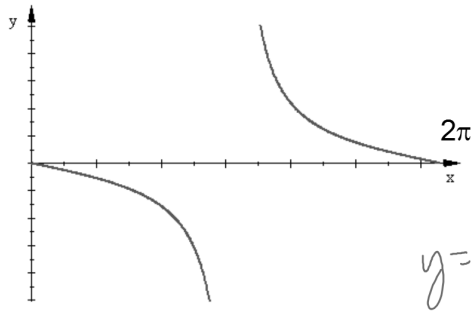
2. What is the equation of this Tangent Function?

$\pi \cdot \frac{3}{\pi}$

$y = Tan\,3x$

this graph is like the Parent Function, therefore, a is Positive.

A Tangent function is graphed in the window 0 to 2π.



1. What is the period?

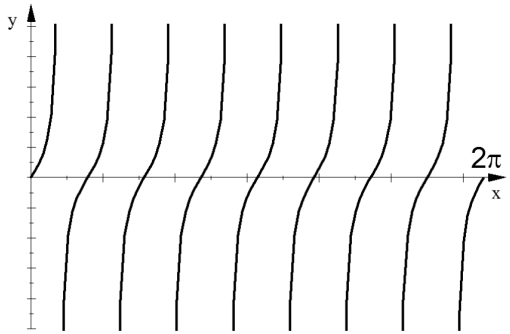
$\frac{2\pi}{1} = 2\pi \quad b = \frac{\pi}{2\pi} = \frac{1}{2}$

2. What is the equation of this Tangent Function?

$y = -Tan\,\frac{x}{2}$

this graph is upside down, therefore, a is negative.

A Tangent function is graphed in the window 0 to 2π.



1. What is the period?

$\frac{2\pi}{8} = \frac{\pi}{4}$

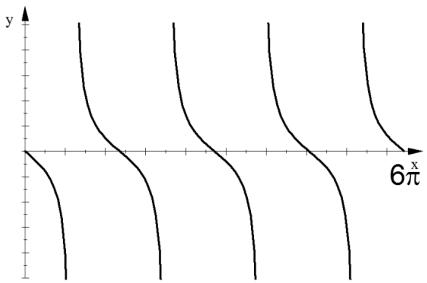
$b = \frac{\pi}{\frac{\pi}{4}} = \pi \cdot \frac{4}{\pi} = 4$

2. What is the equation of this Tangent Function?

$y = Tan\,4x$

this graph is like the Parent Function, therefore, a is Positive.

A Tangent function is graphed in the window 0 to 6π.



1. What is the period?

$\frac{6\pi}{4} = \frac{3\pi}{2}$

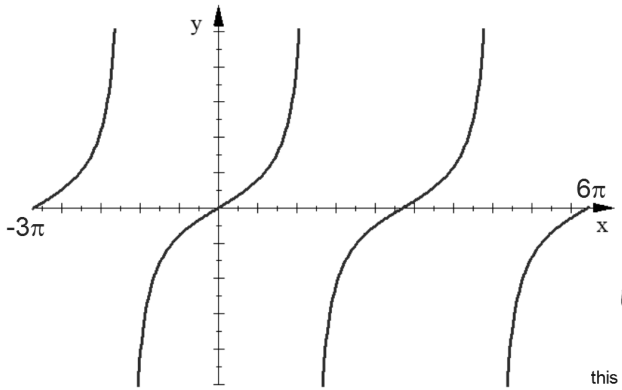
$b = \frac{\pi}{\frac{3\pi}{2}} = \pi \cdot \frac{2}{3\pi} = \frac{2}{3}$

2. What is the equation of this Tangent Function?

$y = -\text{Tan}\frac{2x}{3}$

this graph is upside down, therefore, a is negative.

Write the equation of this Tangent Function



Period

$\frac{9\pi}{3} = 3\pi$

$b = \frac{\pi}{3\pi} = \frac{1}{3}$

$y = \text{Tan}\frac{x}{3}$

this graph is like the Parent Function, therefore, a is Positive.

You can now complete Homework #35

Sec 13-6

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Problems 9,10, 23,24, 38-40

For 23 & 24 just find the period