Sec 13-6: The Tangent Function
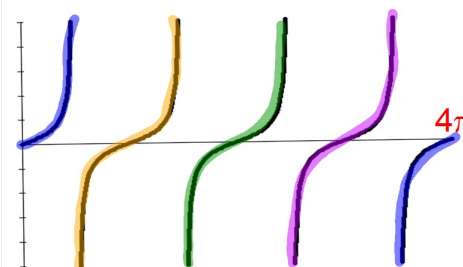
Graph the function   y=Tanx

Use this Window: x:[0,4π]   y:[-10, 10]

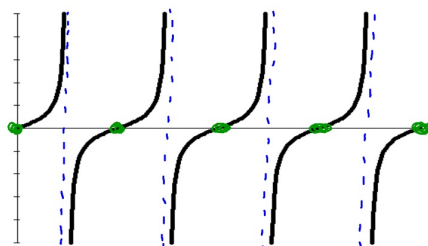What is the period of
the Tangent Function?

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

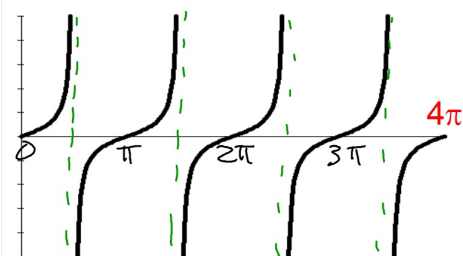Why does the graph of

y = Tanθ   look like this?

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

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

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

The Parent Tangent Function: y = Tanx

4π

Period of Tanθ = π

What are the Eq's of the
Vertical Asymptotes?

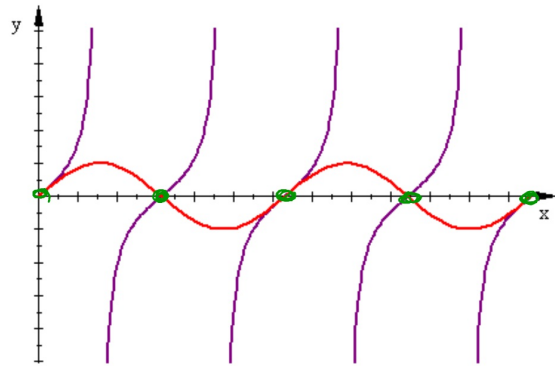$$X = \frac{\pm\pi}{2}, \frac{\pm 3\pi}{2}, \frac{\pm 5\pi}{2}, \frac{\pm 7\pi}{2}$$

½ way between
0 & π
then every π
units right &
left is another
VA

What are the x-intercepts?

$$X = 0, \pm\pi, \pm 2\pi, \pm 3\pi, \pm 4\pi,$$

origin then every π
units right & left
is another X-int

Leave Y$_1$ = Tanx. Graph Y$_2$ = Sinx.
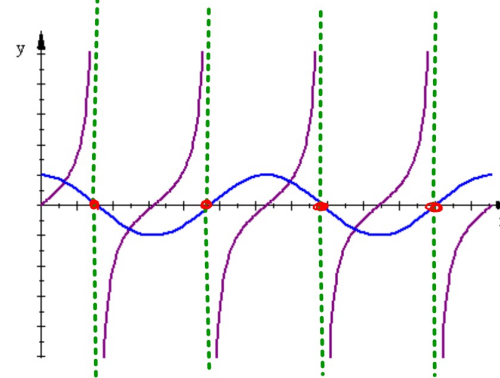

How is the graph of Tanx related to the graph of Sinx?

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.

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

$$y = aTan(bx) = a\left(\frac{Sin(bx)}{Cos(bx)}\right)$$
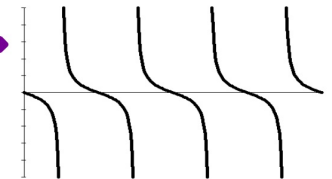
a: If a<0 there is an x-axis reflection ⟶
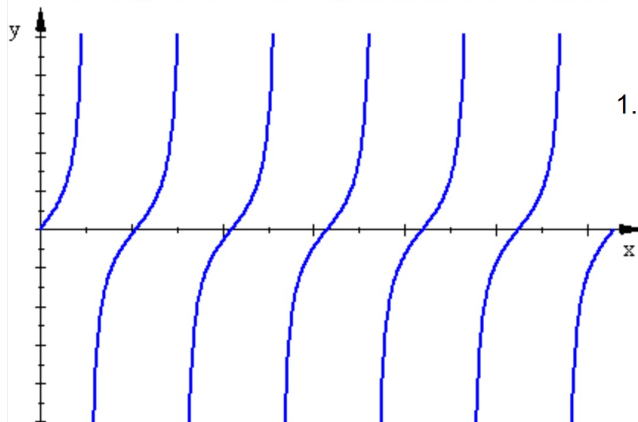

b: The period of Tanbx = $\dfrac{\pi}{b}$

$b = \dfrac{\pi}{period}$

VA occur wherever Cos(bx)=0

x-int occur wherever Sin(bx)=0

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

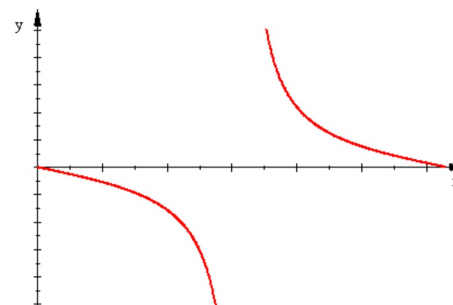
1. What is the period?

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

2. What is the equation of this Tangent Function?

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

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

coeff of Tan (a) is pos because this looks just like the Parent Tan x. This graph moves up & to the right similar to a line with a Pos slope

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

1. What is the period?

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

2. What is the equation of this Tangent Function?
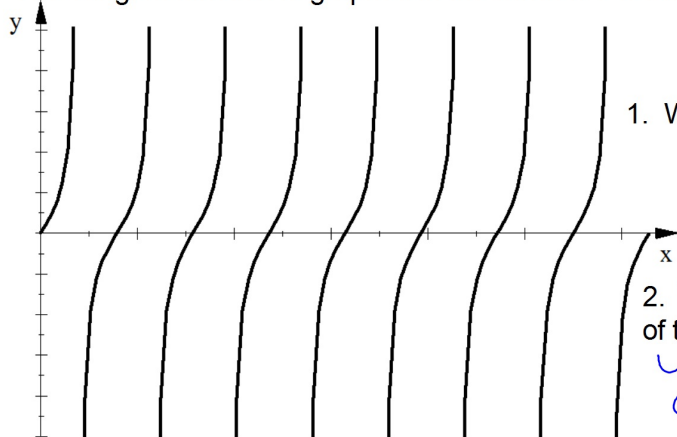
$$b = \frac{\pi}{2\pi} = \frac{1}{2}$$

→ it turns out b will be the reciprocal of the period after canceling π

because the graph moves down & to the right – like a line with a negative slope – therefore the coefficient of Tan (a) will be negative

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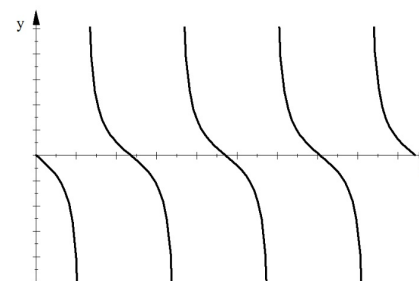

The Tangent function is graphed in the window 0 to 2π.

1. What is the period?

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

2. What is the equation of this Tangent Function

$$y = \text{Tan } 4x$$

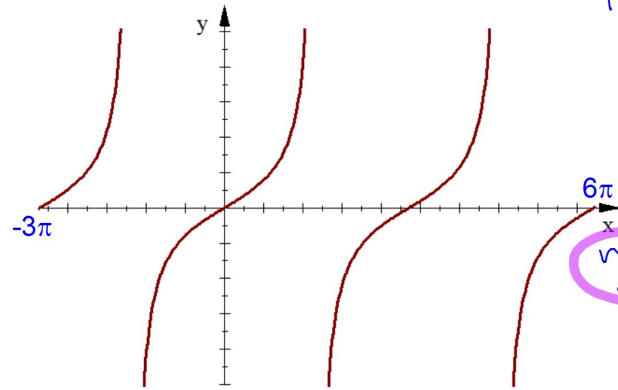The Tangent function is graphed in the window 0 to 6π.

1. What is the period?

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

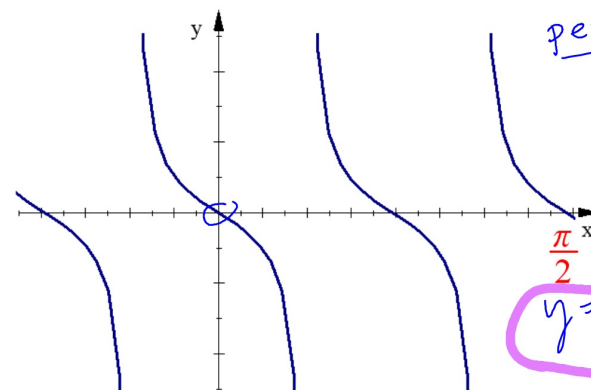2. What is the equation of this Tangent Function?

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

Write the equation of this Tangent Function

Period:

$$\frac{6\pi}{2} \text{ or } \frac{9\pi}{3}$$

$$= 3\pi$$

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

Write the equation of this Tangent Function

period:

$$\frac{\frac{\pi}{2}}{2} = \frac{\pi}{2} \cdot \frac{1}{2}$$

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

$$y = -\text{Tan} 4x$$