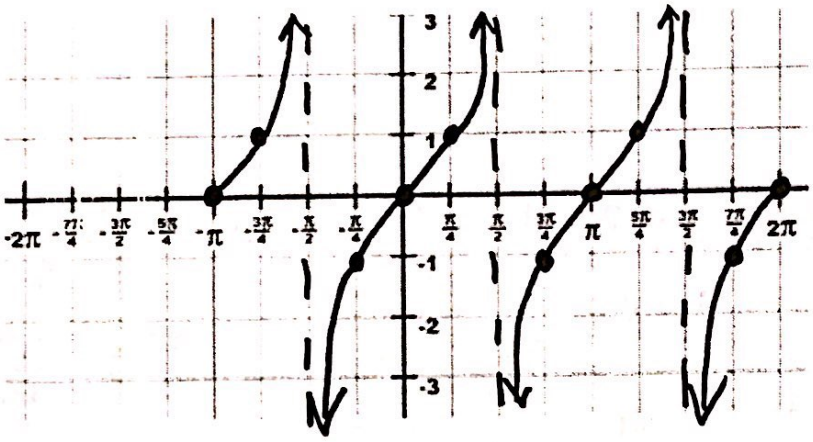
Graphing Tangent and Cotangent

Tangent:

$y = \tan x$ $\quad \tan = \frac{y}{x}$

x	$-\pi$	$-3\pi/4$	$-\pi/2$	$-\pi/4$	0	$\pi/4$	$\pi/2$	$3\pi/4$	π	$5\pi/4$	$3\pi/2$	$7\pi/4$	2π
y	0	1	unde.	−1	$\frac{0}{1}=0$	1	unde.	−1	0	1	unde.	−1	0



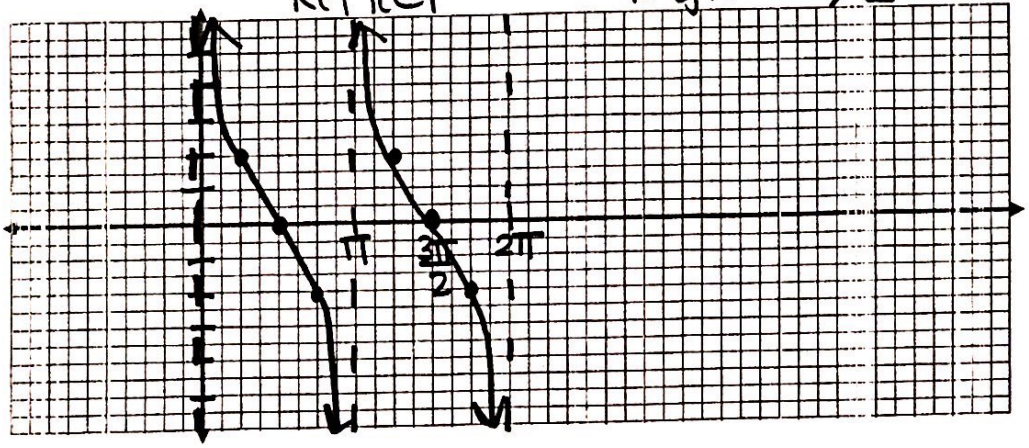
Properties of tangent:

- Has no amplitude
- Period: $\frac{\pi}{b}$
- Asymptote: $\frac{1}{2}$ of Period
- Goes up from left to right

Examples:

1. $y = \tan(2x)$ Period: $\frac{\pi}{b} = \frac{\pi}{2}$ Asy: $\frac{\pi}{2} \cdot \frac{1}{2} = \frac{\pi}{4} \cdot \frac{2}{2} = \frac{2\pi}{8}$

2. $y = -2\tan(x - \frac{3\pi}{2})$ Stretch 2 Reflect Period: π Right $3\pi/2$ Asy: $\pi \cdot \frac{1}{2} = \frac{\pi}{2}$



Cotangent:

At x=0:

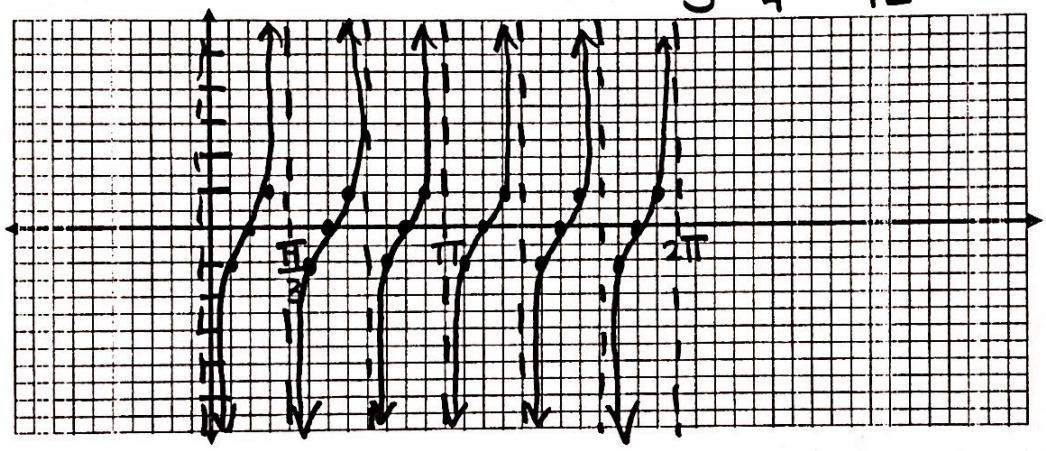
- The tangent has a zero (a point on x-axis)
- The cotangent has an asymptote.
- This component repeats after the period.
- Half way in between the graph has the "other" characteristic.

The tangent goes up (left to right), the cotangent goes down (left to right).

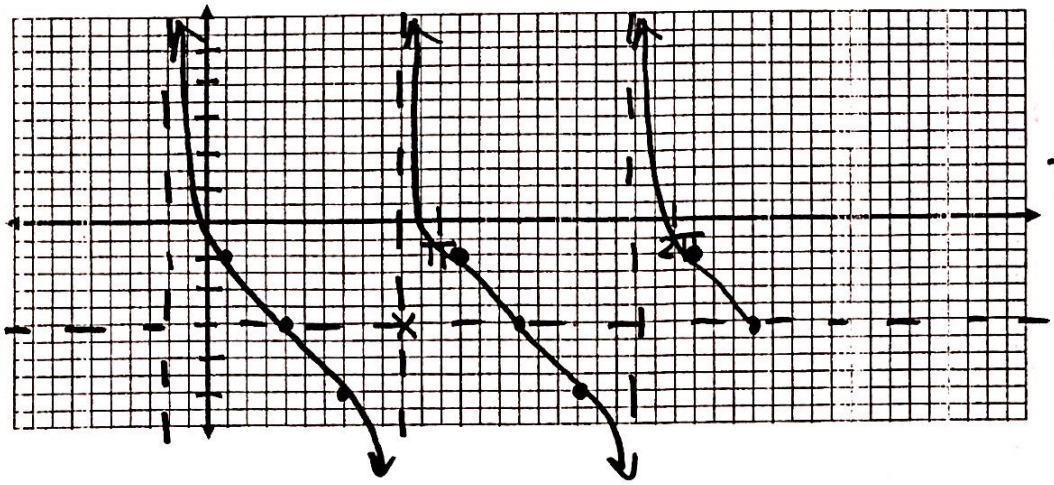
Half way in between the primary components, the curve has a point the same distance as the amplitude up (or down) from the axis.

Examples:

3. $y = -\cot(3x)$ Reflect Period: $\frac{\pi}{3} \div 4 = \frac{4\pi}{12}$ Points: $\frac{\pi}{3} \cdot \frac{1}{2} = \frac{\pi}{6}$ $\frac{\pi}{6} \cdot 2 = \frac{2\pi}{12}$



4. $y = 2\cot(x - \frac{5\pi}{6}) - 3$ Stretch 2 Right $\frac{5\pi}{6}$ Down 3 Period: π



$\frac{5\pi}{6} \cdot 2 = \frac{10\pi}{6}$

Point: $\pi \cdot \frac{1}{2} = \frac{\pi}{2}$ $\frac{\pi}{2} \cdot 6 = \frac{6\pi}{12}$