

# GRAPHS OF $\tan x$ + $\cot x$

$$y = a \sin(bx+c) + d$$

	$\sin$ $\cos$	$\sec$ $\csc$	$\tan$ $\cot$
amp	$ a $	NA	NA
per.	$\frac{2\pi}{b}$	$\frac{2\pi}{b}$	$\frac{\pi}{b}$
p.s.	$bx+c=0$	$bx+c=0$	$bx+c=0$
v.s.	$d$	$d$	$d$

$$y = \tan x$$

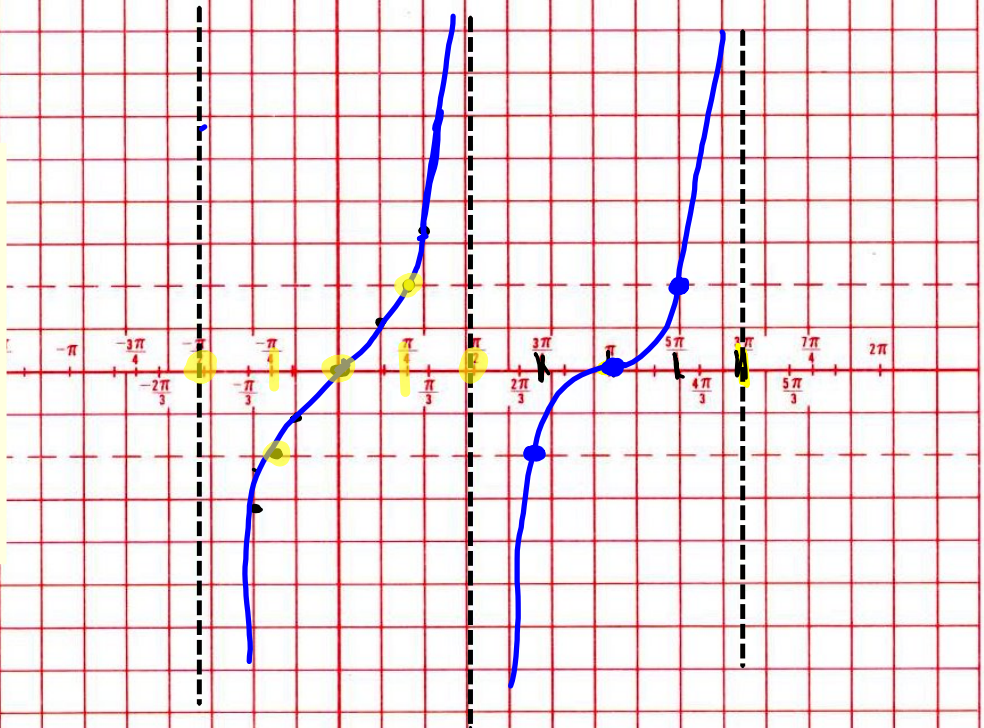
- \* rises
- \* If  $-a$ , falls
- \* Phase shift -  
Shift center pt.

$$y = \cot x$$

- \* falls
- \* If  $-a$ , rises
- \* Phase shift -  
Shifts asymptote

$$y = \tan x$$

0	0
$\pi/6$	$\frac{\sqrt{3}}{3} \approx 0.6$
$\pi/4$	1
$\pi/3$	$\sqrt{3} \approx 1.7$
$\pi/2$	Undef



$$y = \cot x$$

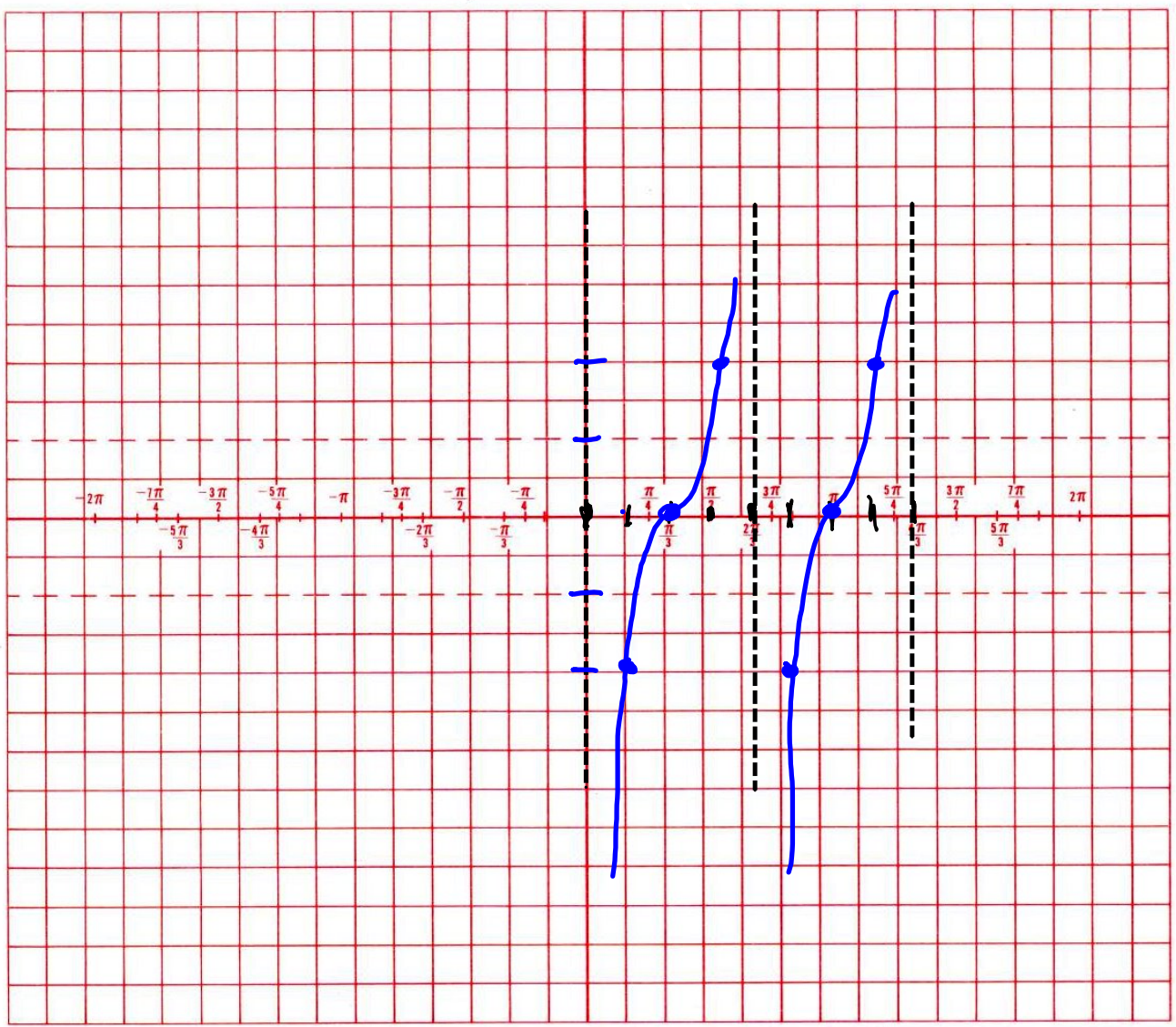
0	undef
$\frac{\pi}{6}$	$\sqrt{3} = 1.7$
$\frac{\pi}{4}$	1
$\frac{\pi}{3}$	$\frac{\sqrt{3}}{3} = 0.6$
$\frac{\pi}{2}$	0



$y = 2 \tan\left(\frac{3}{2}x - \frac{\pi}{2}\right)$   
 amp  $\frac{2\pi}{NA(2)}$     period  $\frac{2\pi}{3/2} = \frac{4\pi}{3}$     p.s.  $x = \frac{\pi}{2} \cdot \frac{2}{3} = \frac{\pi}{3}$     v.s.  $\frac{0}{0}$   
 $x = \frac{\pi}{3}$

0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$
0	$\frac{\pi}{6}$	$\frac{2\pi}{3}$	$\frac{3\pi}{6}$	$\frac{4\pi}{6}$

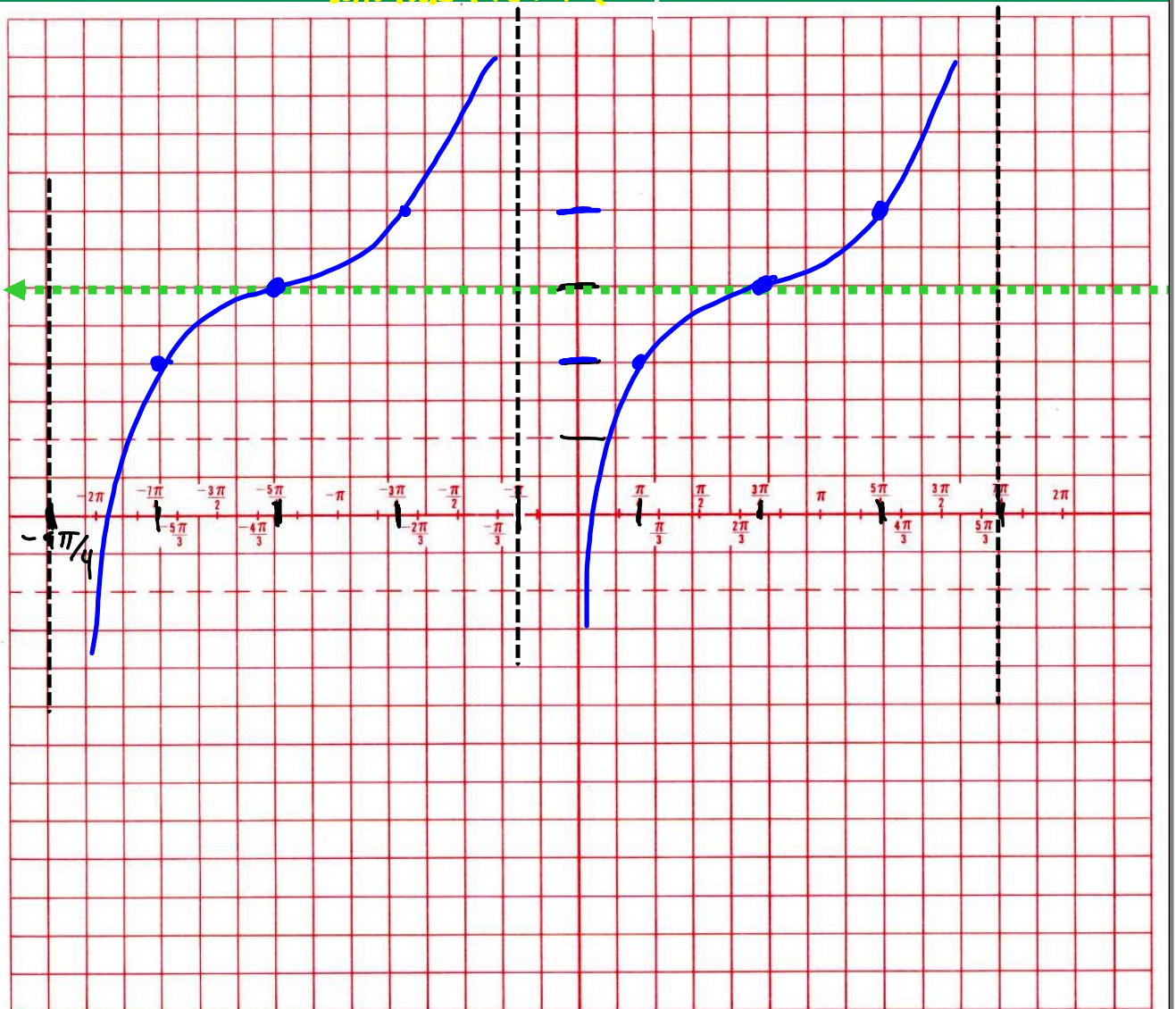
spacing: per.  $\cdot \frac{1}{4} = \frac{4\pi}{3} \cdot \frac{1}{4} = \frac{\pi}{3}$

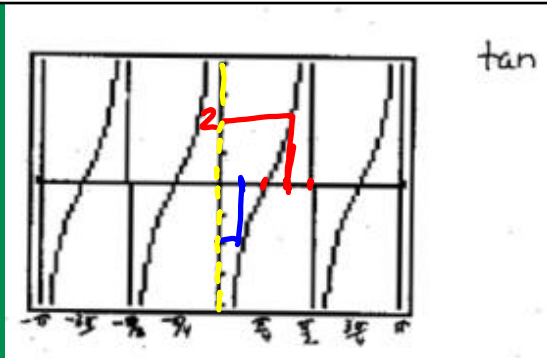


$$y = 3 - \cot\left(\frac{1}{2}x + \frac{\pi}{8}\right)$$

$\frac{V.S}{3}$     amp     $\frac{per.}{\frac{\pi}{12} = 2\pi}$      $\frac{PS}{\frac{1}{2}x = -\frac{\pi}{8} \Rightarrow x = -\frac{\pi}{4}}$   
 NA (-1)    *will look like tan x*

$\left\{ \begin{array}{l} -\frac{\pi}{4} \quad \frac{\pi}{4} \quad \frac{3\pi}{4} \quad \frac{5\pi}{4} \quad \frac{7\pi}{4} \\ -\frac{\pi}{4} \quad \frac{\pi}{4} \quad \frac{3\pi}{4} \quad \frac{5\pi}{4} \quad \frac{7\pi}{4} \end{array} \right.$   
 Spacing:  $2\pi \cdot \frac{1}{4} = \frac{\pi}{2} = 2\frac{\pi}{4}$





$-\pi \quad -\frac{3\pi}{4} \quad -\frac{\pi}{2} \quad -\frac{\pi}{4} \quad 0 \quad \frac{\pi}{4} \quad \frac{\pi}{2} \quad \frac{3\pi}{4} \quad \pi$

V.S. 0

amp 2

period  $\frac{\pi}{2}$

p.s.  $\frac{\pi}{4}$

$$b = \frac{\pi}{\text{period}} = \frac{\pi}{\frac{\pi}{2}} = 2$$

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