

# GRAPHING $\tan x + \cot x$

$$y = a \frac{\quad}{\quad} (bx+c) + d$$

	$\frac{\sin}{\cos}$	$\frac{\sec}{\csc}$	$\frac{\tan}{\cot}$
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	$d$	$d$	$d$

$$\frac{\sin x}{\cos x} \quad \frac{\sec x}{\csc x}$$

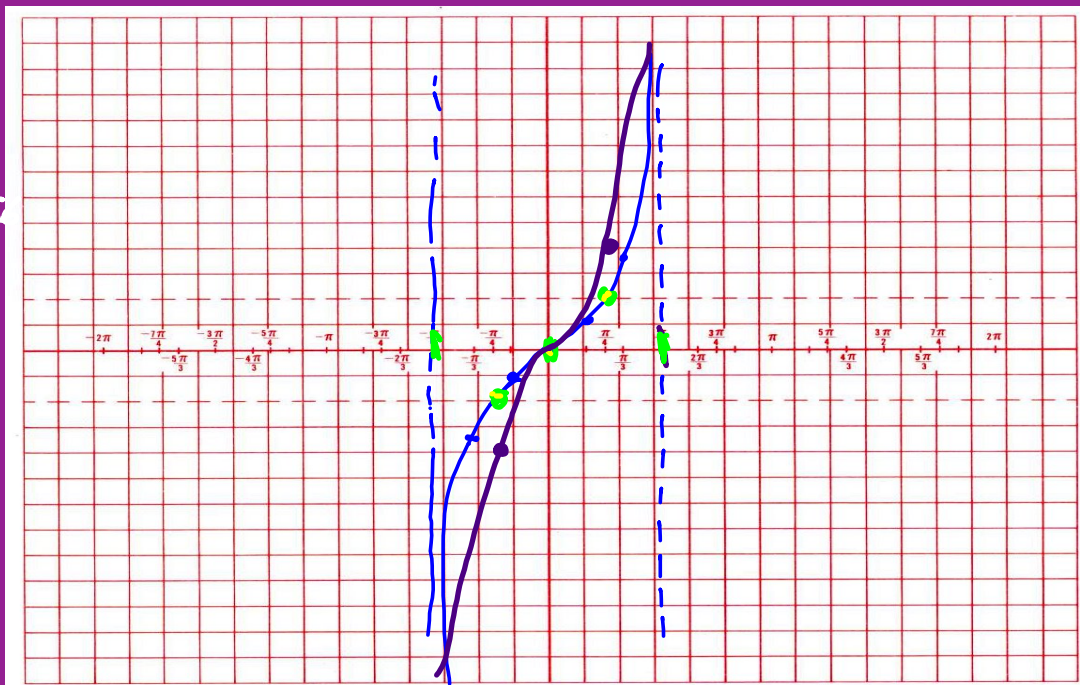
$$b = \frac{2\pi}{\text{period}}$$

$$\frac{\tan x}{\cot x}$$

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

$\tan x$  rises /  $\tan x$  shifts center pt  
 $\cot x$  falls /  $\cot x$  shifts the asymptote

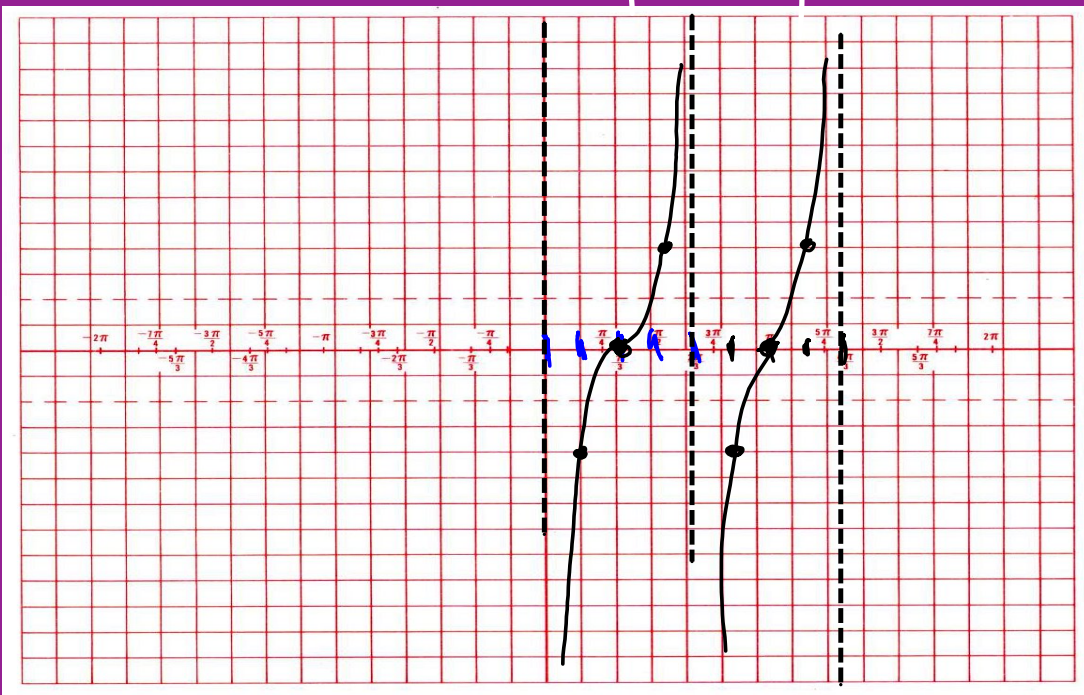
$x$	$y = 2 \tan x$
$0$	$0$
$\frac{\pi}{6}$	$\frac{\sqrt{3}}{3} = 0.5$
$\frac{\pi}{4}$	$1$
$\frac{\pi}{3}$	$\sqrt{3} = 1.7$
$\frac{\pi}{2}$	Undef.



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

p.s.  $\frac{3}{2}x - \frac{\pi}{2} = 0$   
 $\frac{3}{2}x = \frac{\pi}{2}$   
 $x = \frac{\pi}{3}$

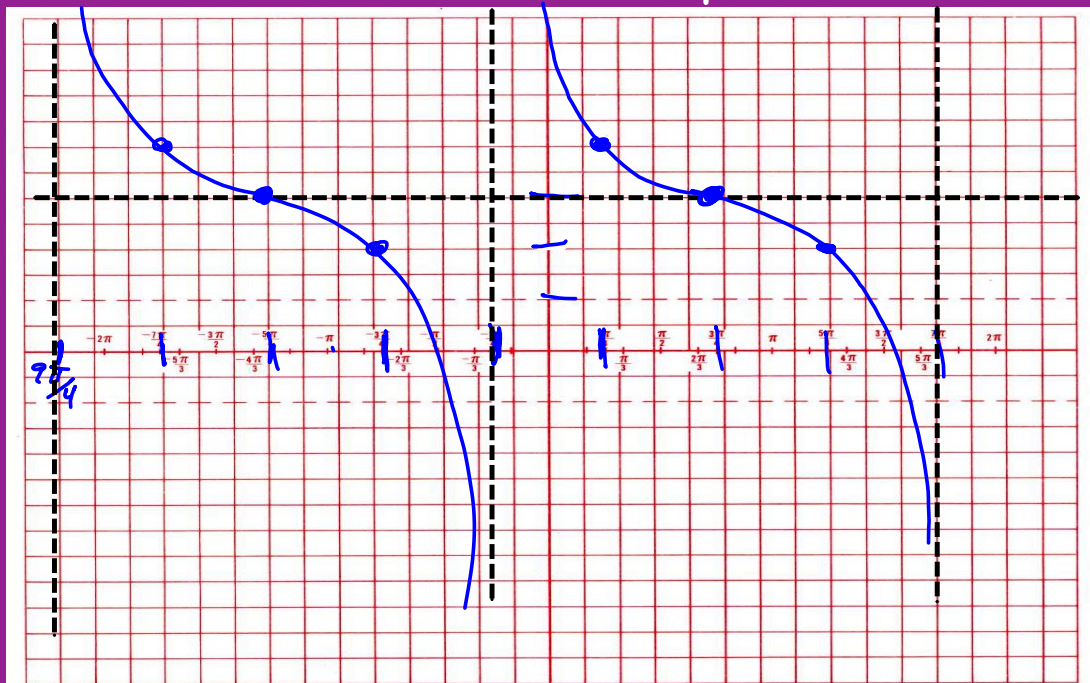
Spacing	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$
			↑		
			p.s. *		
	$0$	$\frac{\pi}{6}$	$\frac{2\pi}{6}$	$\frac{3\pi}{6}$	$\frac{4\pi}{6}$



$y = 3 + \cot\left(\frac{1}{2}x + \frac{\pi}{8}\right)$   
 v.s. 3  
 amp NA(1)  
 p.s.  $\frac{1}{2}x = -\frac{\pi}{8} \cdot 2$   
 $x = -\pi/4$

spacing  
 $2\pi \cdot \frac{1}{4}$   
 $= \pi/2$

$-\frac{\pi}{4} \quad \frac{\pi}{4} \quad \frac{3\pi}{4} \quad \frac{5\pi}{4} \quad \frac{7\pi}{4}$

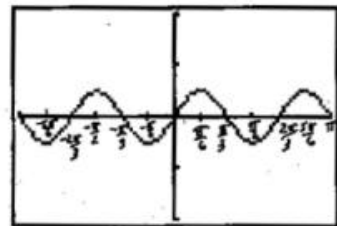


V.S. 0  
amp 2

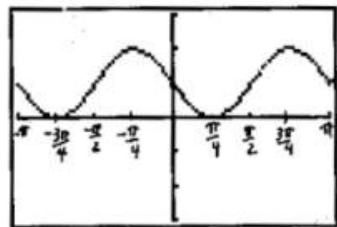
period  $\frac{\pi}{2}$ .  $b = \frac{\pi}{\text{period}} = \frac{\pi}{\pi/2}$

P.S.  $\frac{\pi}{4}$   
 $= \pi \cdot \frac{2}{4}$

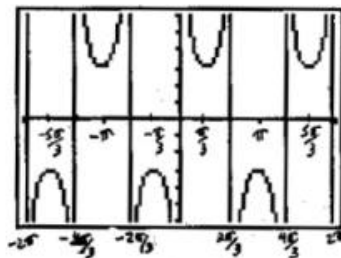
$$y = 2 \tan\left(2\left(x - \frac{\pi}{4}\right)\right)$$



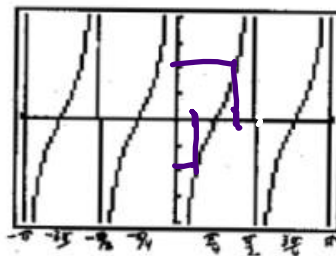
Sin



cos



sec



tan