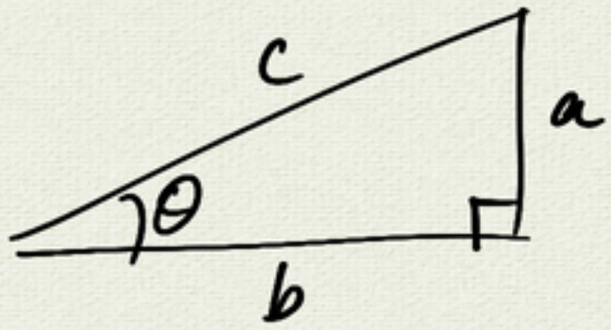
1.1 Unit Circle

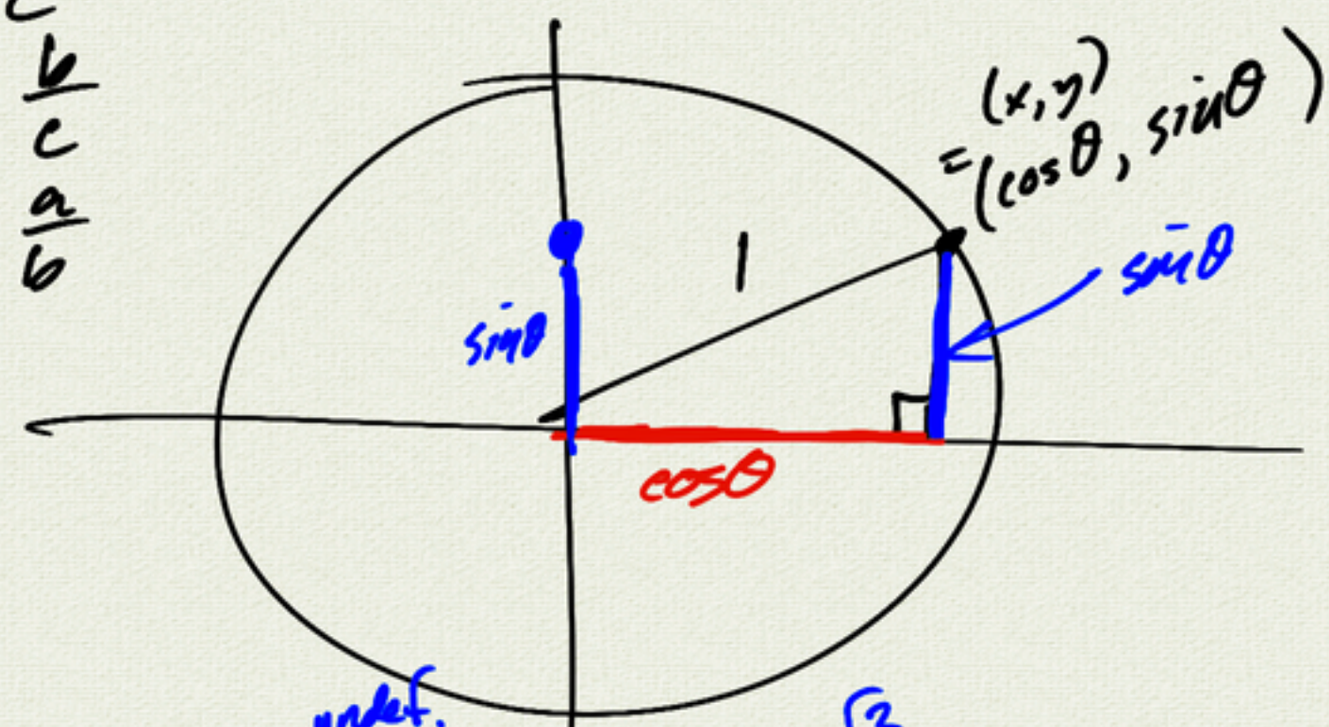
SOH CAH TOA

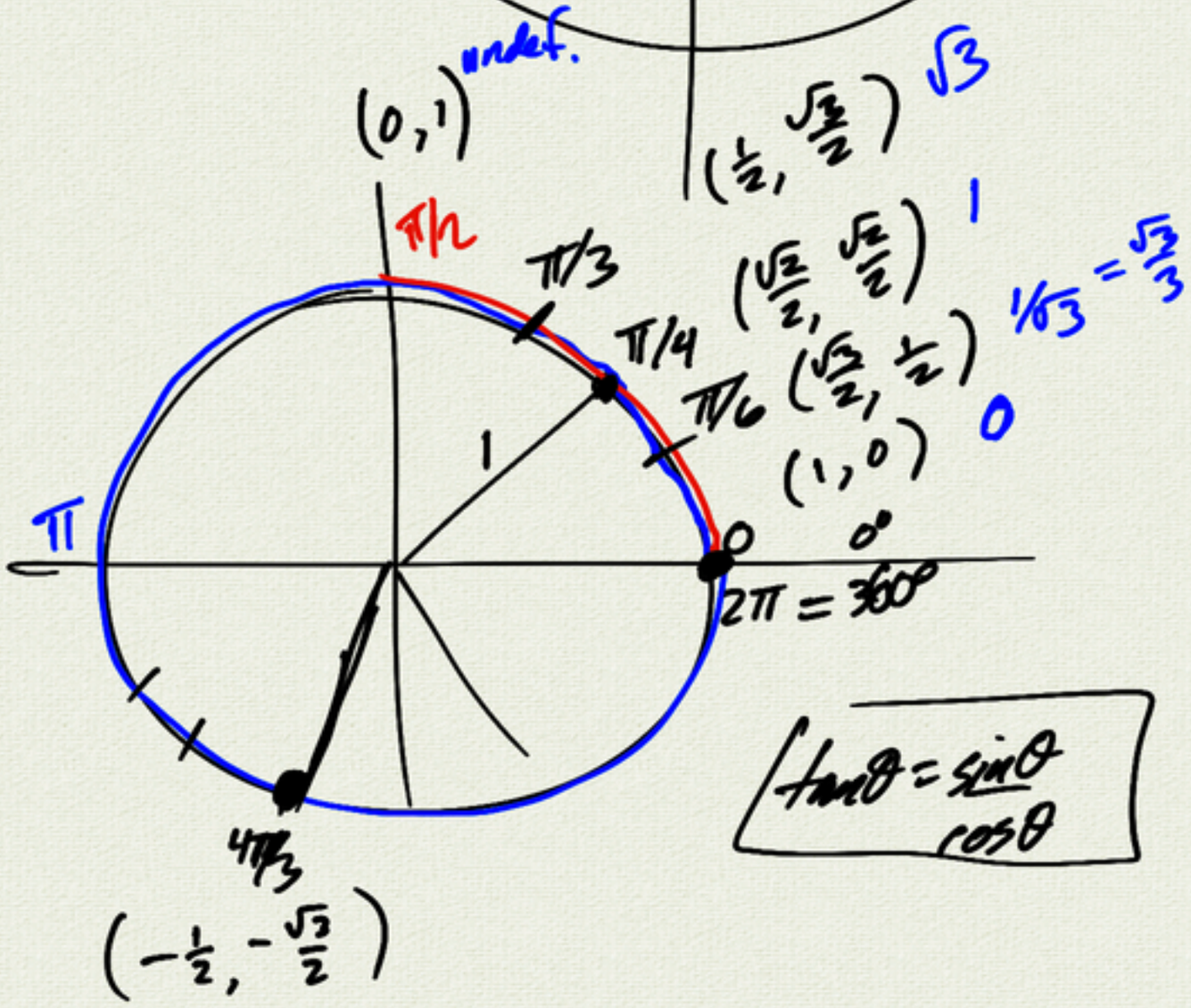


$\sin\theta = \frac{a}{c}$

$\cos\theta = \frac{b}{c}$

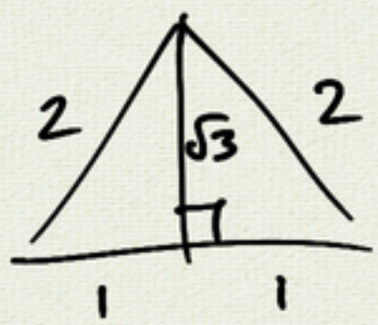
$\tan\theta = \frac{a}{b}$





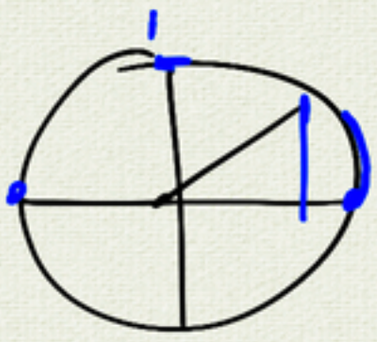
$$\tan\theta = \frac{\sin\theta}{\cos\theta}$$

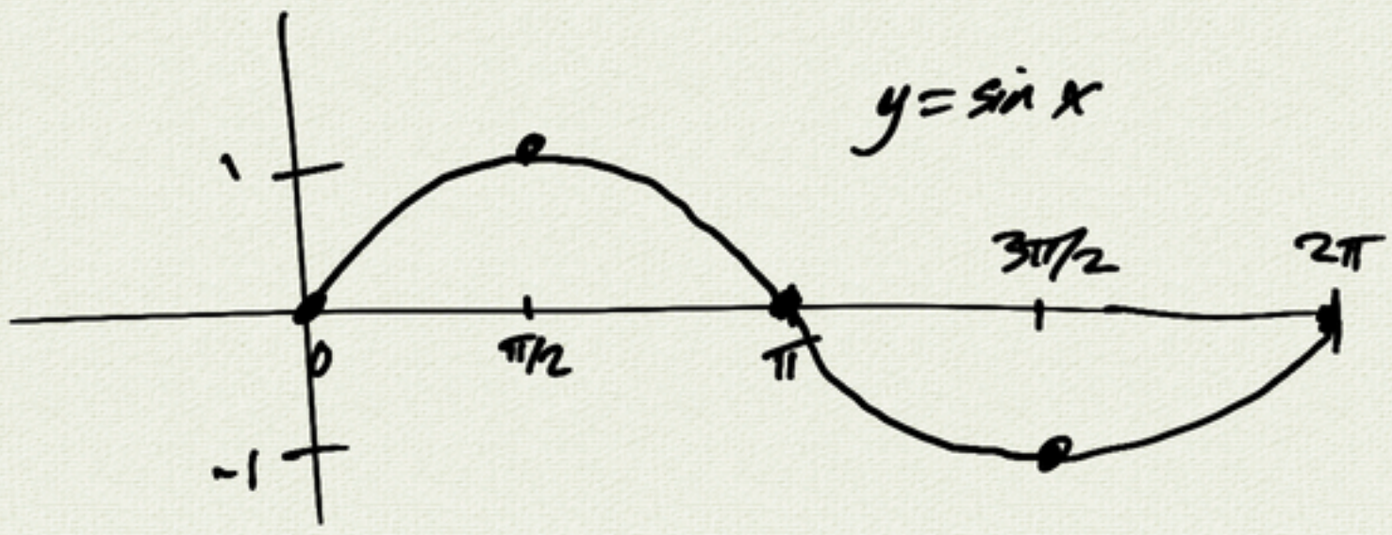
$\sin\frac{\pi}{4} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$



graphs

$y = \sin x$

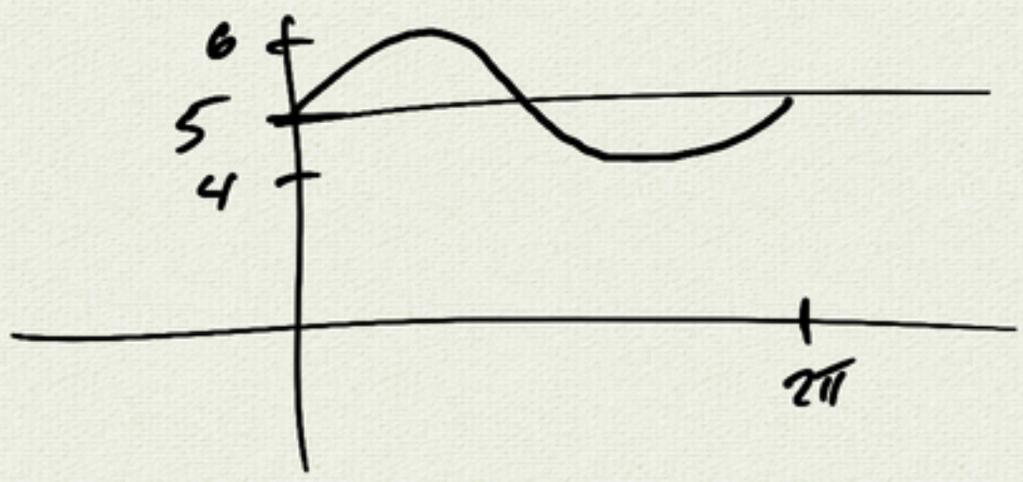




$y = f(x)$

$y = (\sin x) + 5$

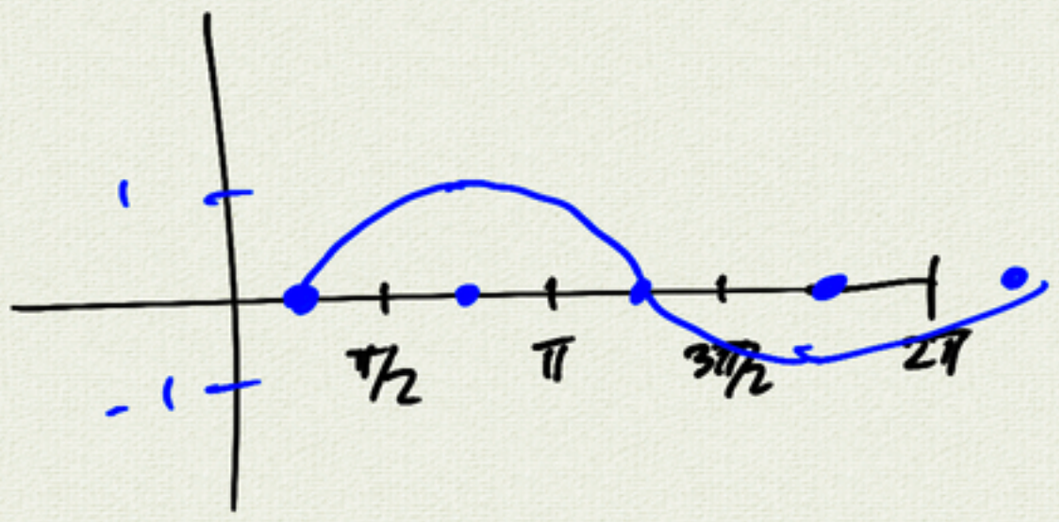
vertical shift +5



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

↖ horizontal shift right $\pi/4$

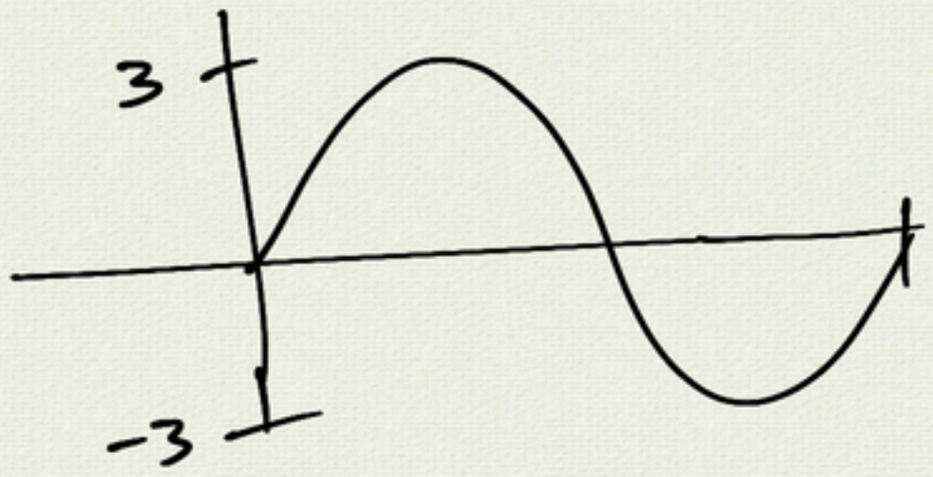
x	$x - \pi/4$	$\sin(x - \pi/4)$
$\pi/4$	0	0
$\pi/2 + \pi/4$	$\pi/2$	1
$\pi + \pi/4$	π	0
$3\pi/2 + \pi/4$	$3\pi/2$	-1
$2\pi + \pi/4$	2π	0



$y = 3\sin x$

vertical scale ×3

amplitude 3



$y = \sin 2x$

horizontal shrink 2

scale $\frac{1}{2}$

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

in this case: period $\frac{2\pi}{2} = \pi$

x	$2x$	$\sin 2x$
0	0	0
$\pi/4$	$\pi/2$	1
$\pi/2$	π	0
$3\pi/4$	$3\pi/2$	-1
π	2π	0

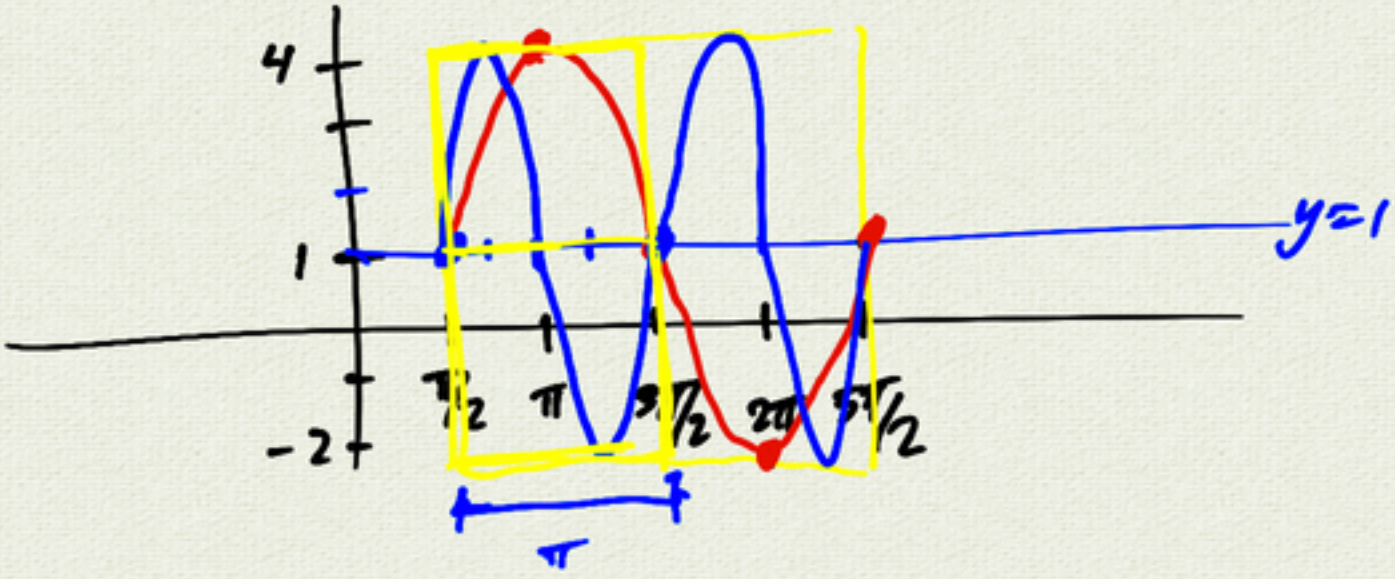
$y = 3\sin\left(2\left(x - \frac{\pi}{2}\right)\right) + 1$

amplitude 3

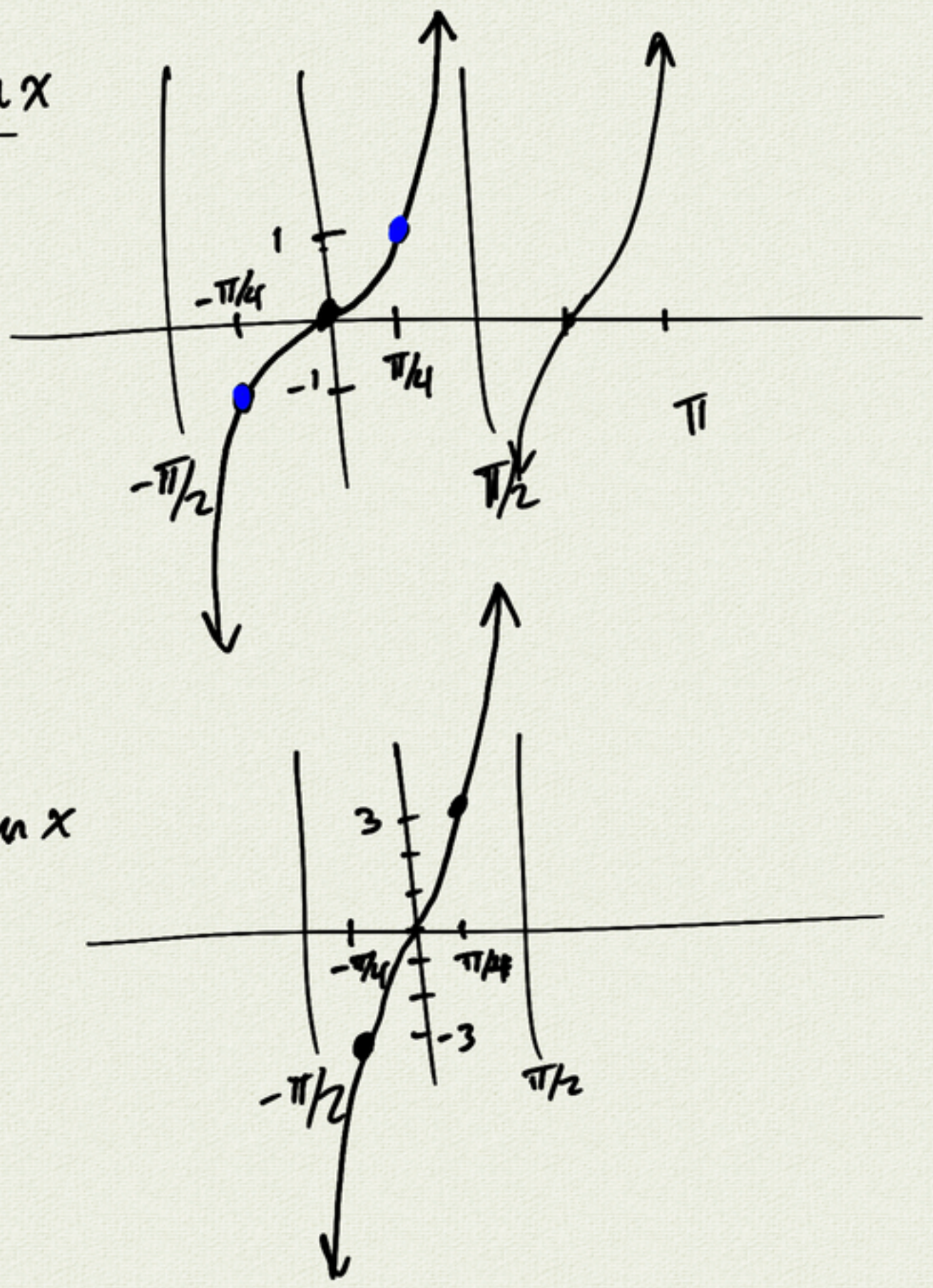
period $\frac{2\pi}{2} = \pi$

shift right $\frac{\pi}{2}$

shift up 1



$\tan x$



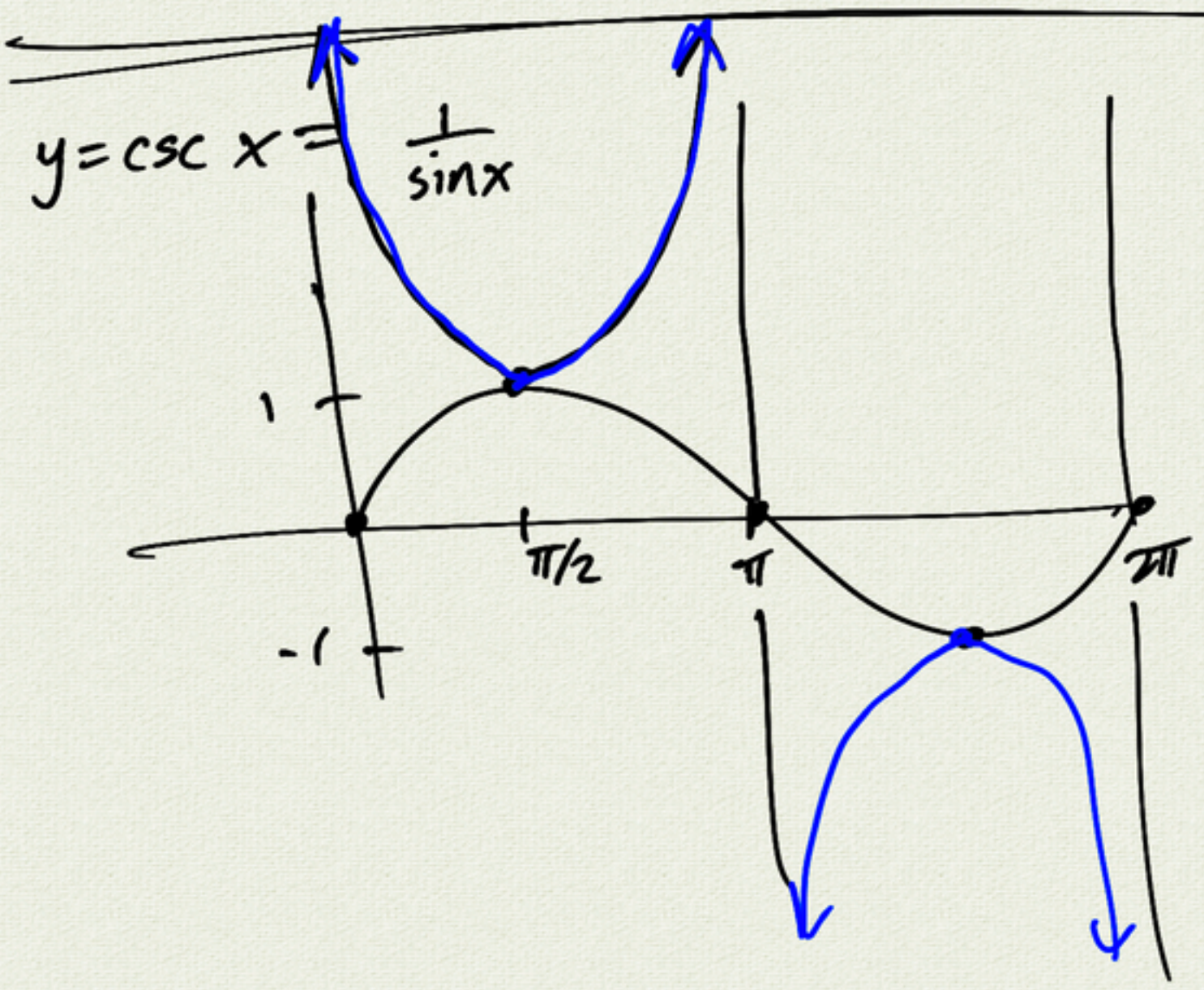
$y = 3\tan x$

$\csc x = \frac{1}{\sin x}$

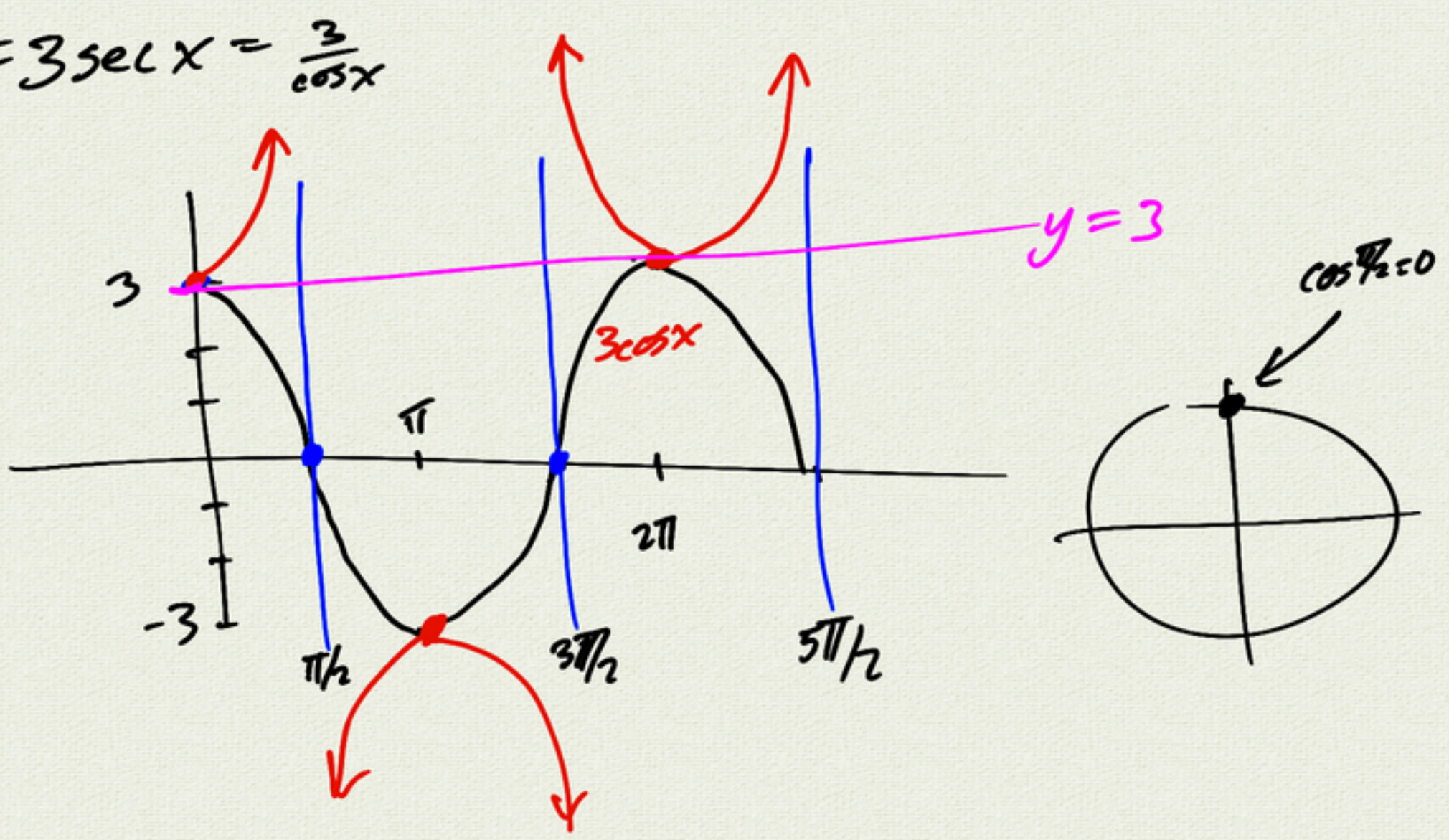
$\sec x = \frac{1}{\cos x}$

$\cot x = \frac{1}{\tan x} = \frac{\cos x}{\sin x}$

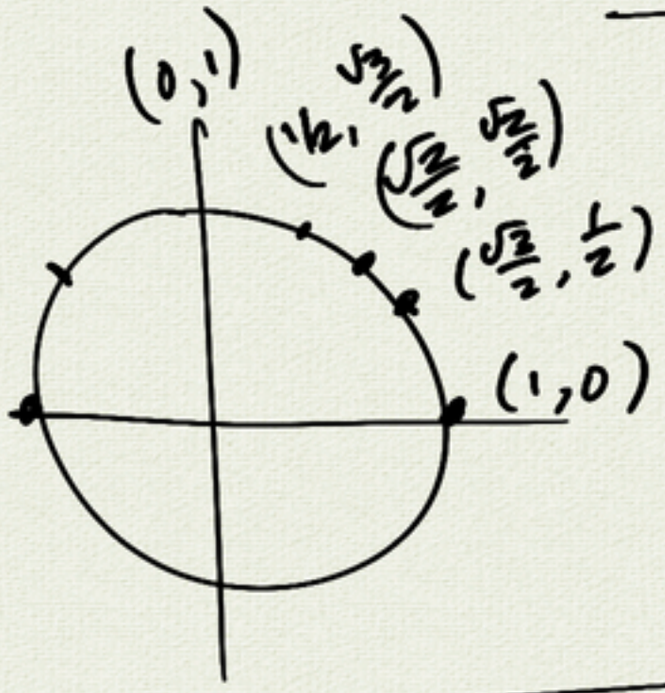
$y = \csc x = \frac{1}{\sin x}$

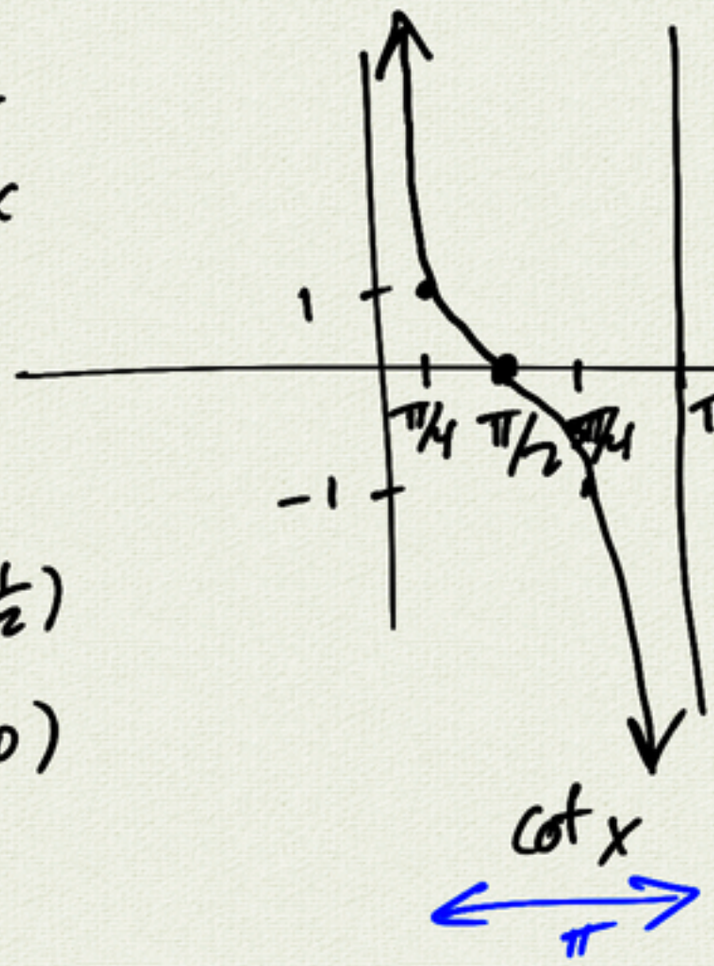


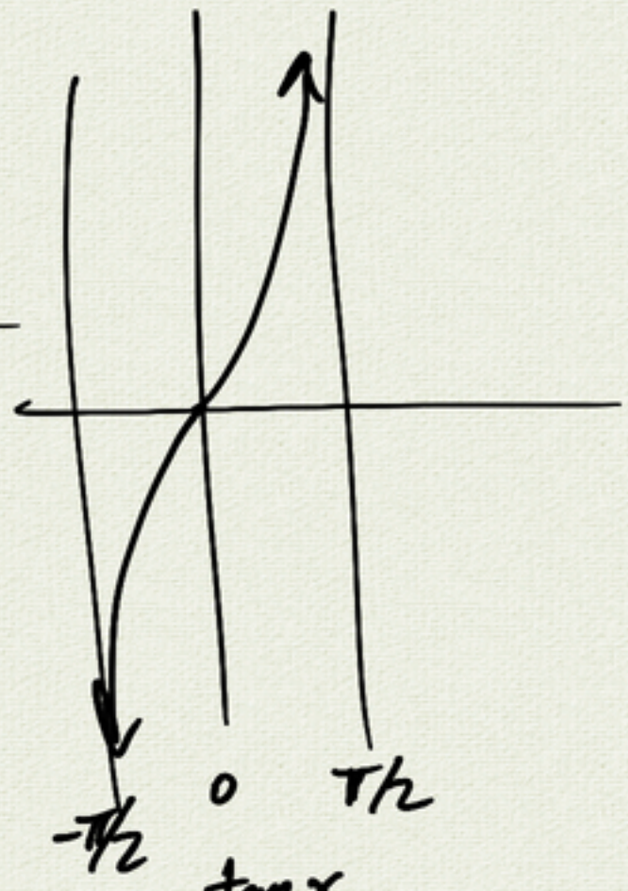
$y = 3\sec x = \frac{3}{\cos x}$



$$y = \cot x = \frac{\cos x}{\sin x}$$







natural period

$y = \tan 2x$ ← period $\frac{\pi}{b} = \frac{\pi}{2}$

$a \sin[b(x-h)] + k$

amplitude

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

(h,k) center

sin 5x
cos 5x
sec 5x
csc 5x

← period $\frac{2\pi}{5}$

tan 5x
cot 5x

← period $\frac{\pi}{5}$