horizontal shift -4

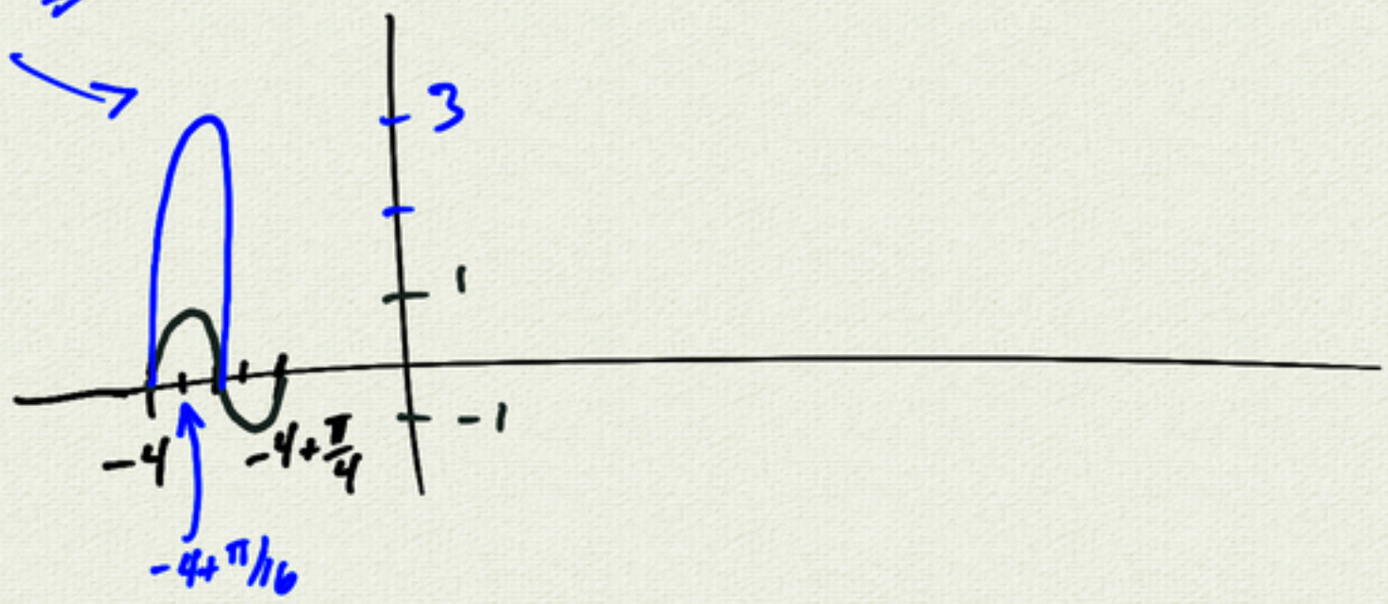
period $\frac{\pi}{4}$

$y = \sin\left(8(x+4)\right)$

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

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

if amplitude $= 3$



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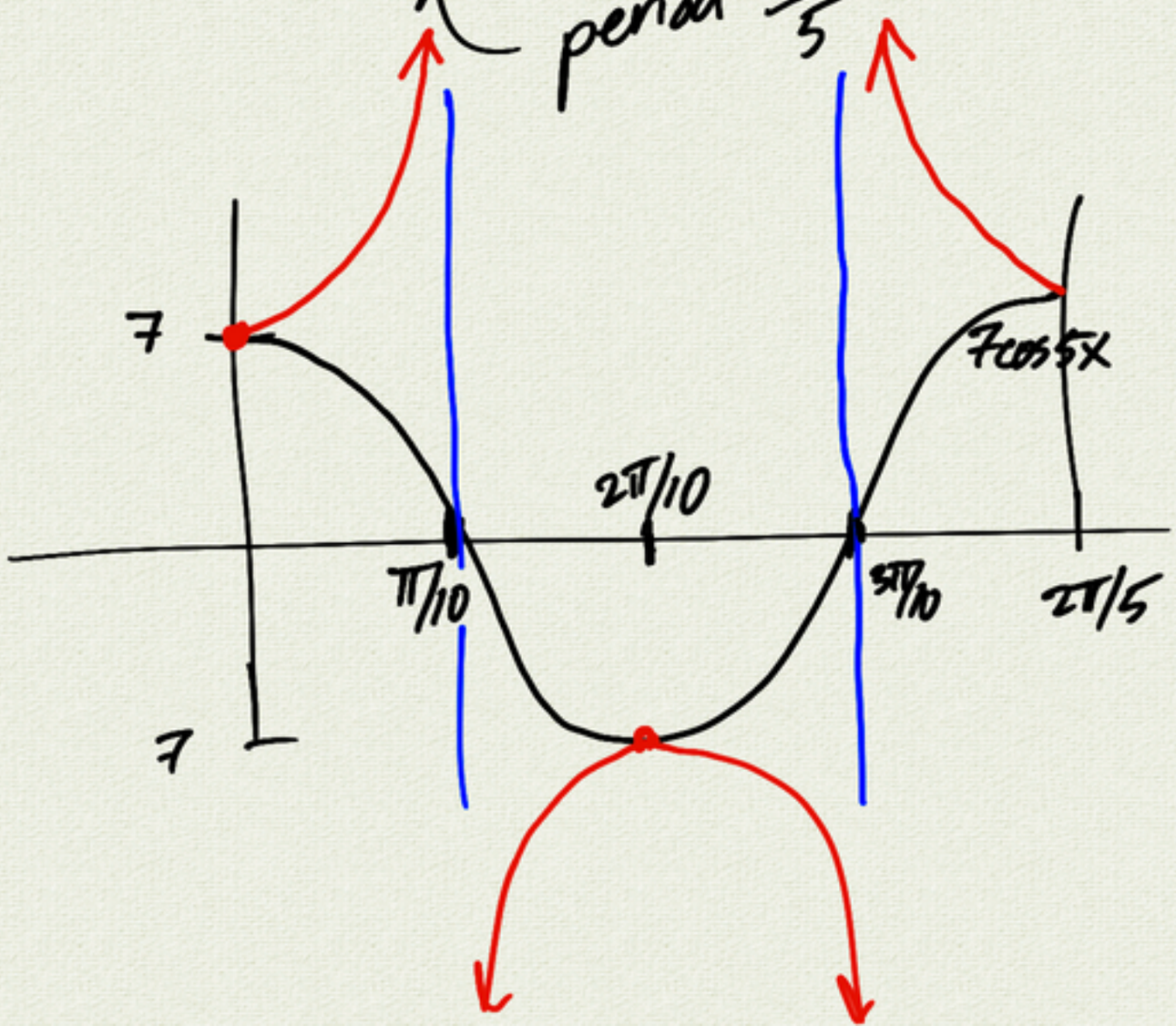
(31) $7\sec 5x$

$7\sec 5x = \frac{7}{\cos 5x}$

period $\frac{2\pi}{5}$



asymptotes

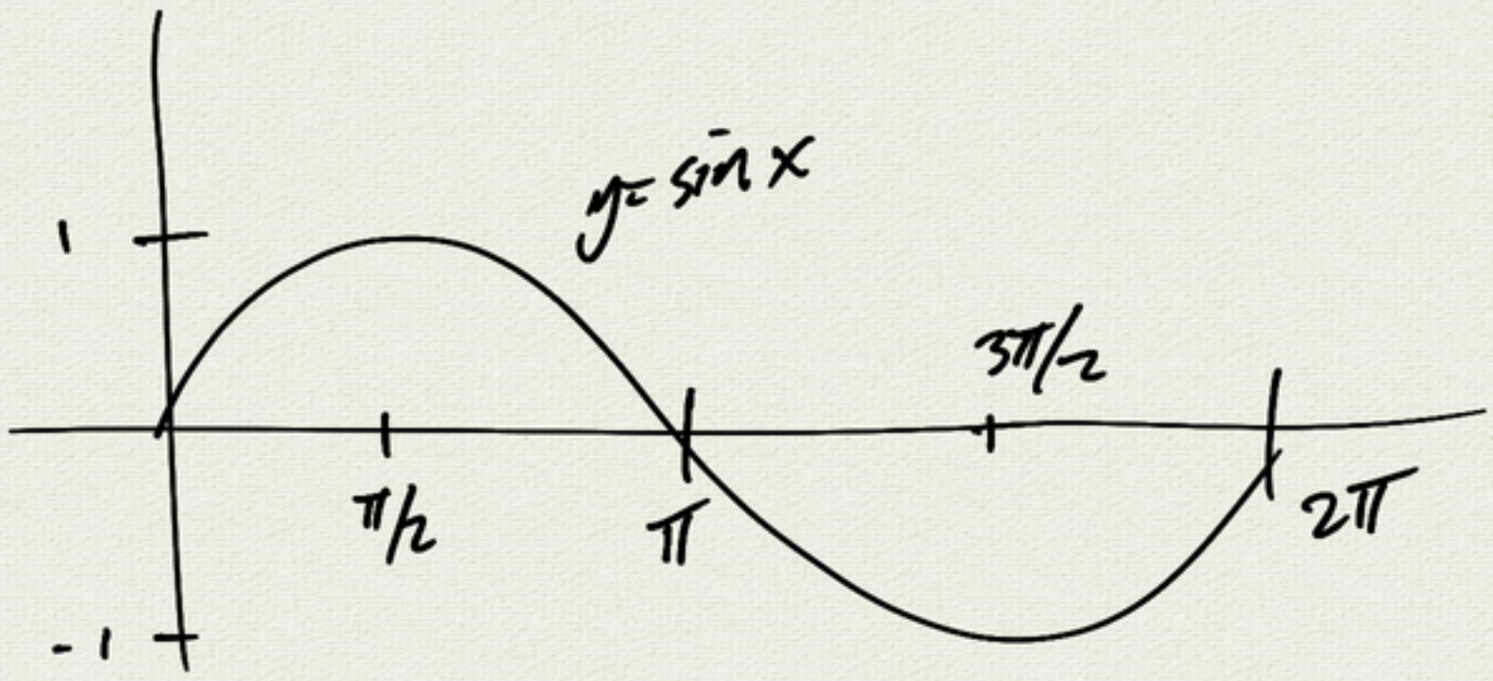
(where $\cos 5x = 0$)

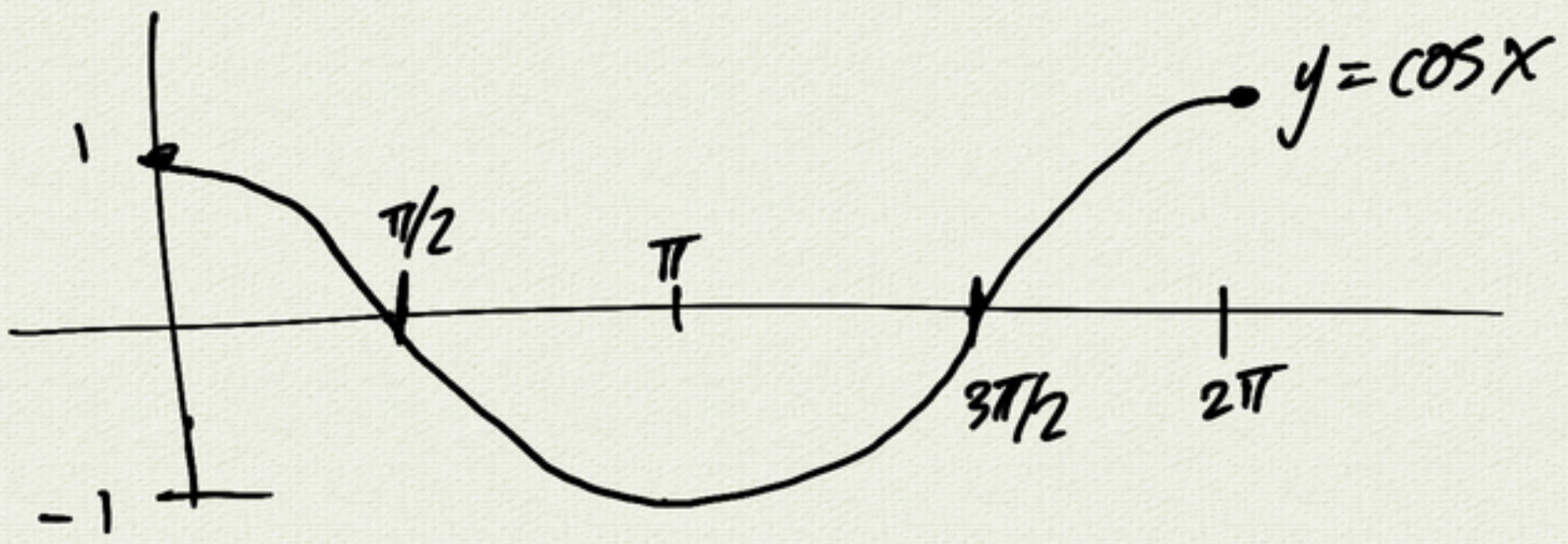
$x = \frac{\pi}{10} + k\frac{\pi}{5}$

$(k \in \mathbb{Z})$ integers

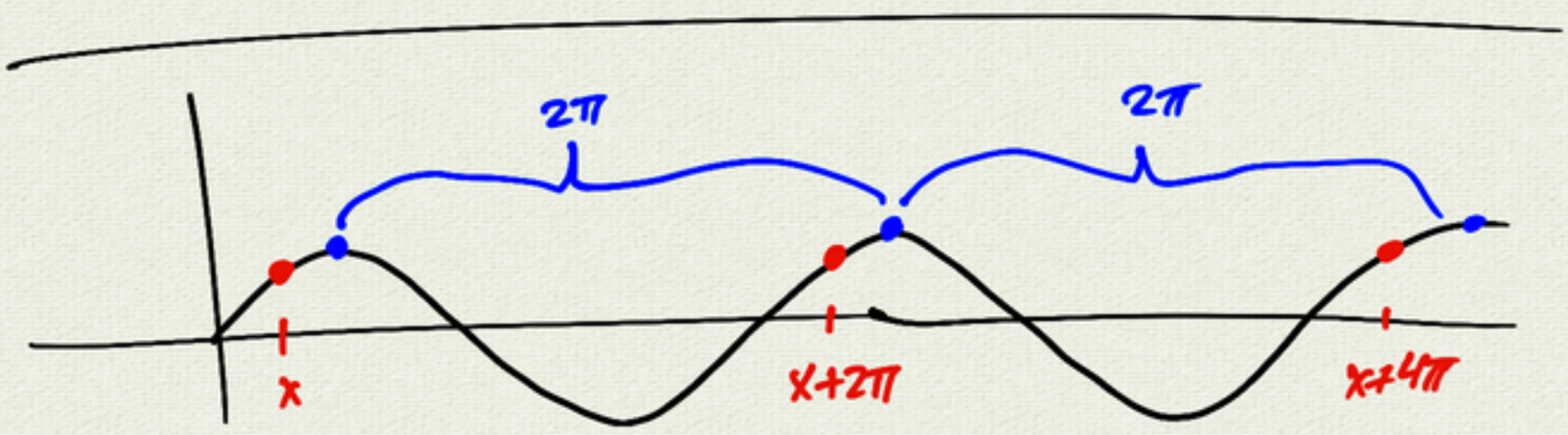
"k is a member of"

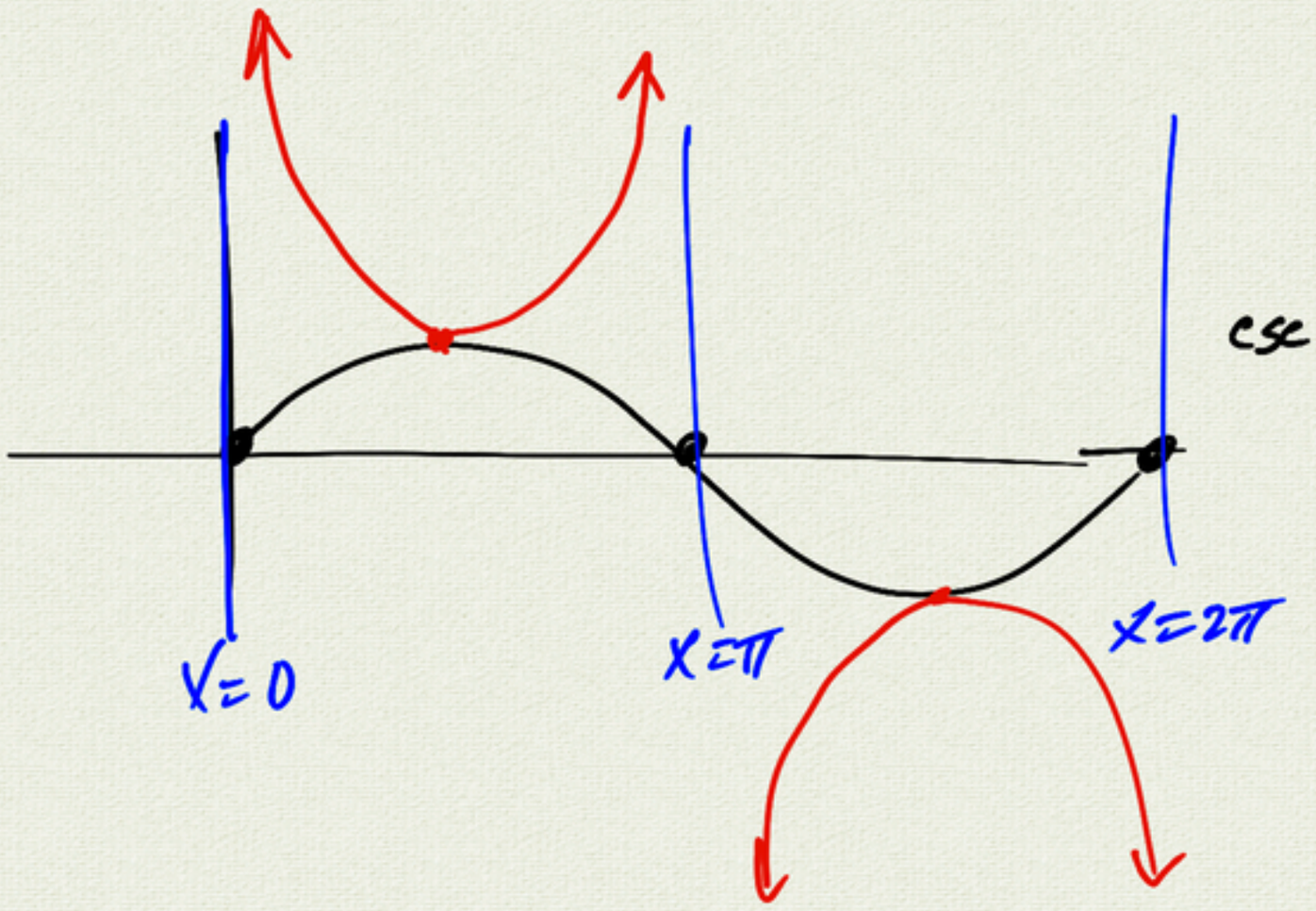
(15) $y = 3\sin 8(x+4) + 5$





f is periodic if there is some number p such that $f(x+p) = f(x)$ for any x





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

asymptotes
$x = k\pi$
$(k \in \mathbb{Z})$

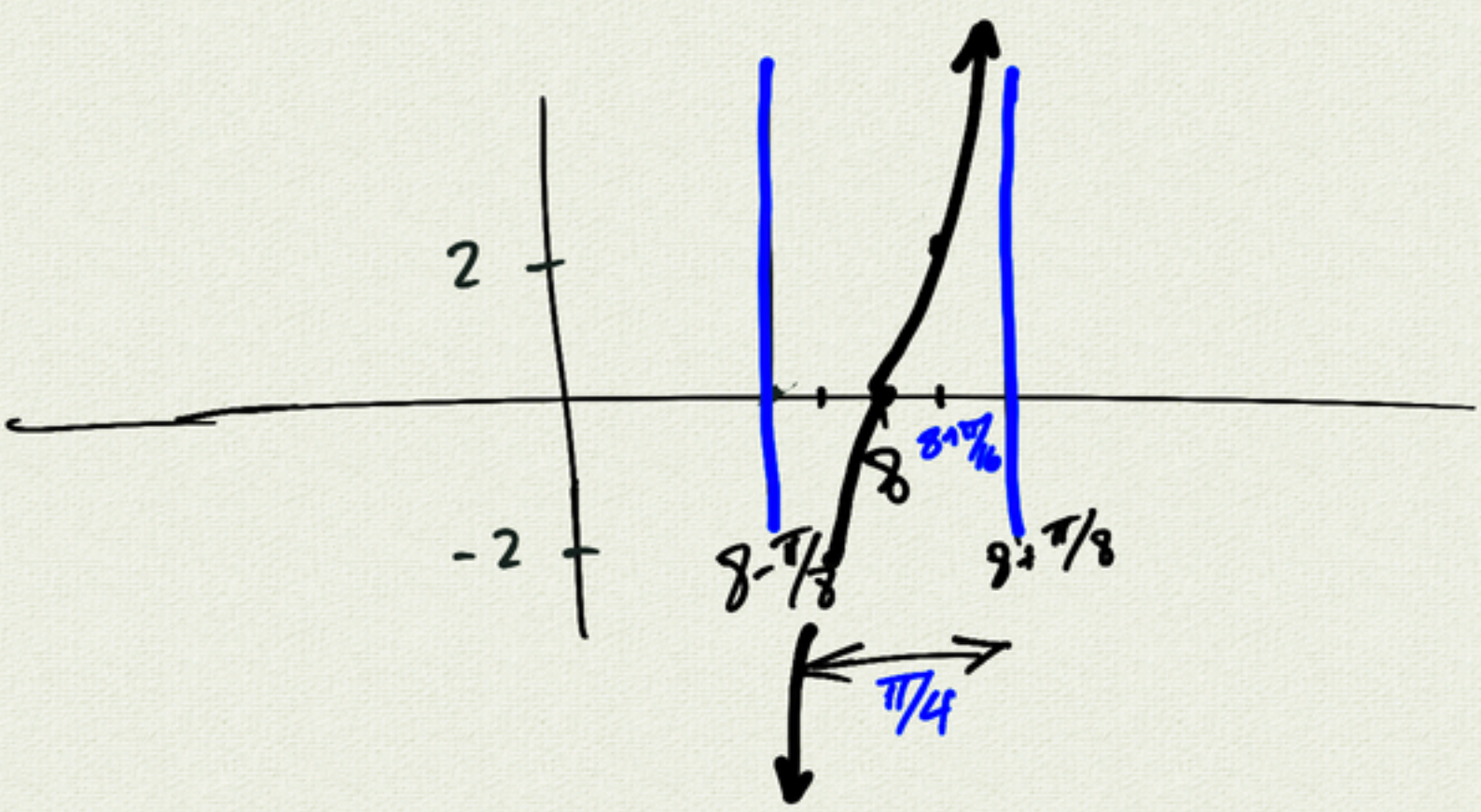
$$f(x) = 2\tan(4x - 32)$$

$$= 2\tan[4(x-8)]$$

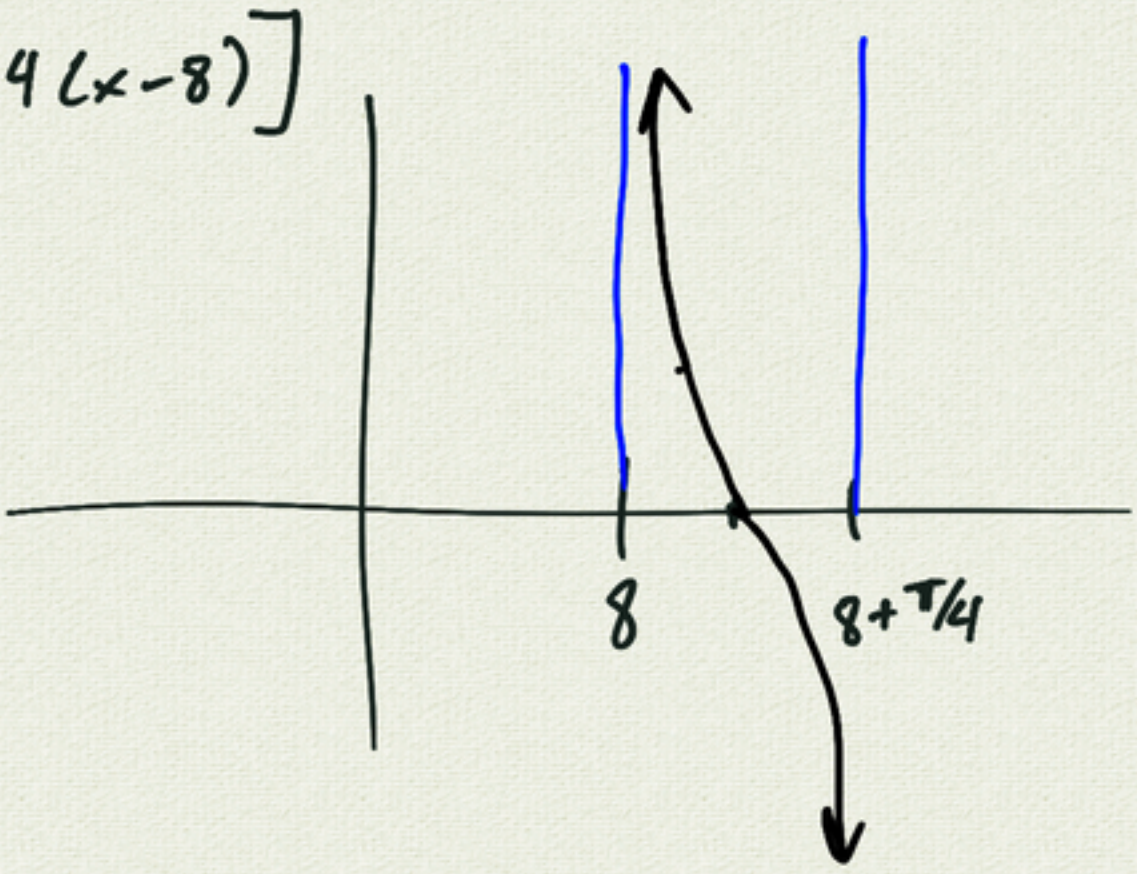
vertical scale 2 ← 2

period $\frac{\pi}{4}$ ← 4 ← natural period

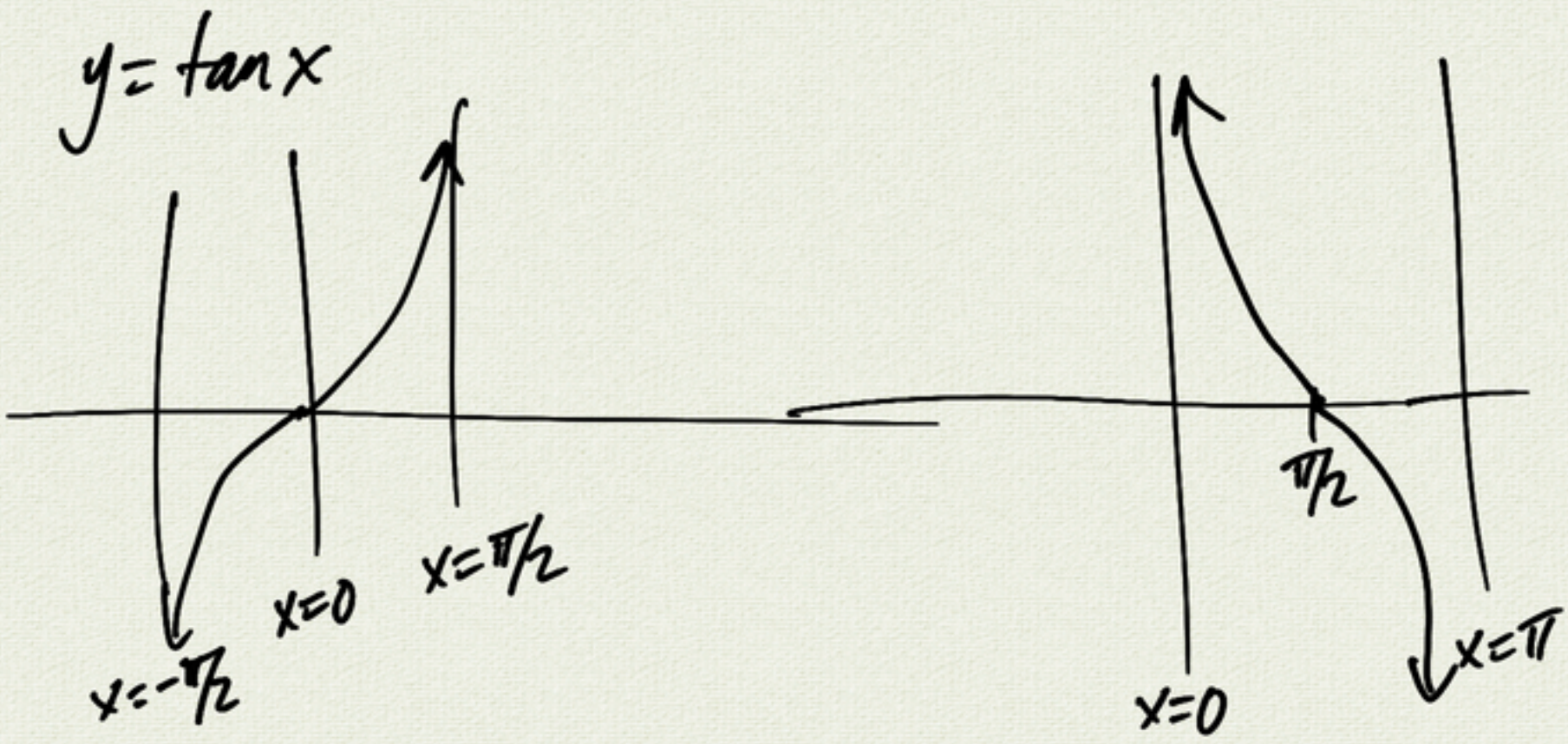
horizontal shift 8 ← 8



$2\cot[4(x-8)]$



$y = \tan x$

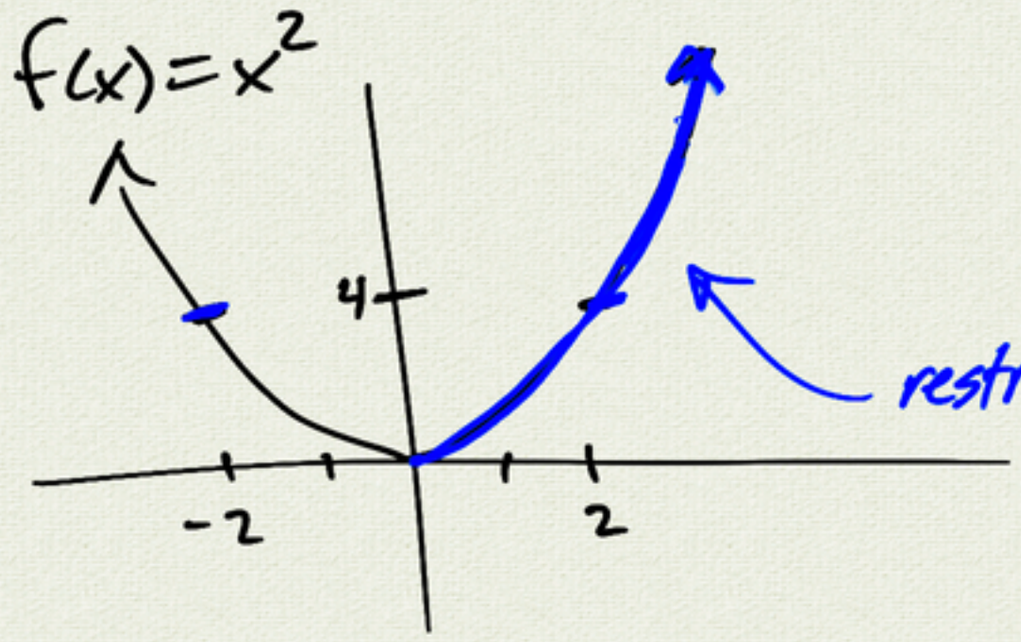


1.3 Inverse Trig Functions

$x^2 = 4 \Rightarrow$

$x = \pm 2$

$= \pm\sqrt{4}$

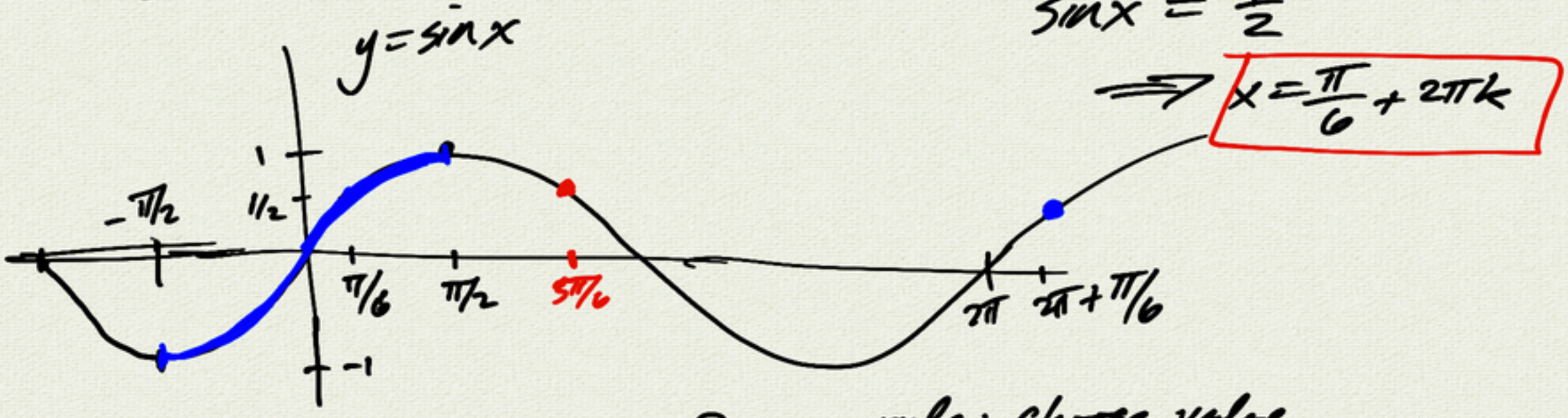


restrict domain

$\Rightarrow$ function is 1-1

one-to-one

$\Rightarrow$ horizontal line test



$\sin x = \frac{1}{2}$

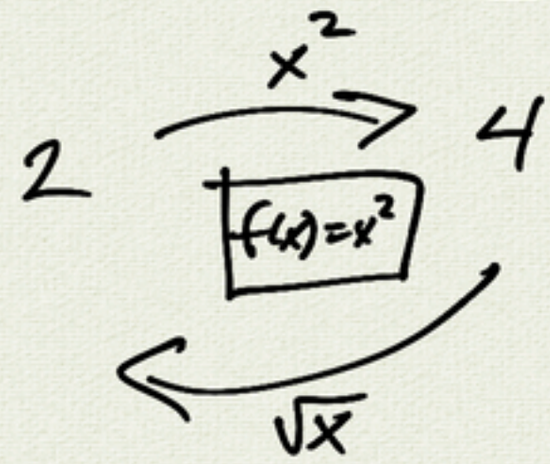
$\Rightarrow x = \frac{\pi}{6} + 2\pi k$

$\sin^{-1}\left(\frac{1}{2}\right) = ?$

rule: Choose value in $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

$\sin^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{6}$

$\sin^{-1}\left(-\frac{1}{2}\right) = -\pi/6$



angle	$\xrightarrow{\sin}$	ratio
0		0
$\pi/6$		1/2
$\pi/2$		1

$\xleftarrow{\sin^{-1}}$

$\sin\left(\frac{\pi}{6}\right) = \sin\left(\frac{13\pi}{6}\right) = \frac{1}{2}$

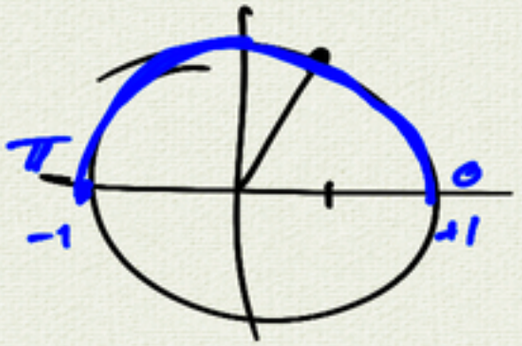
$\sin^{-1}\left(\sin\frac{\pi}{6}\right) = \sin^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{6}$

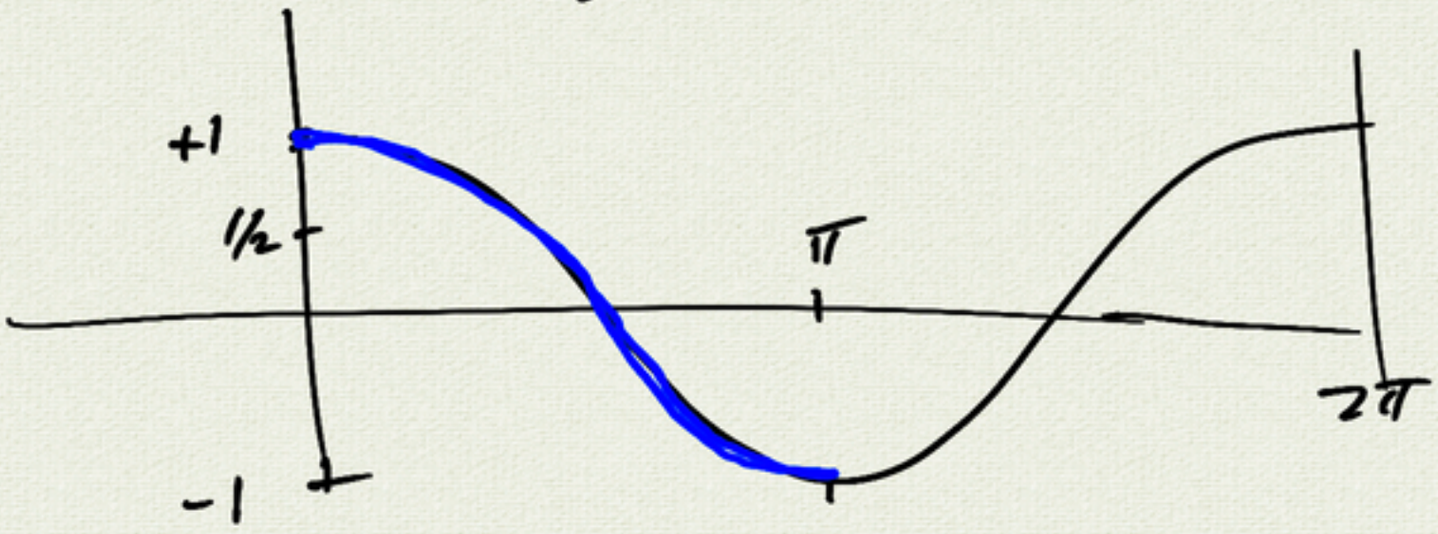
$\sin^{-1}\left(\sin\frac{13\pi}{6}\right) = \sin^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{6}$ weird

---

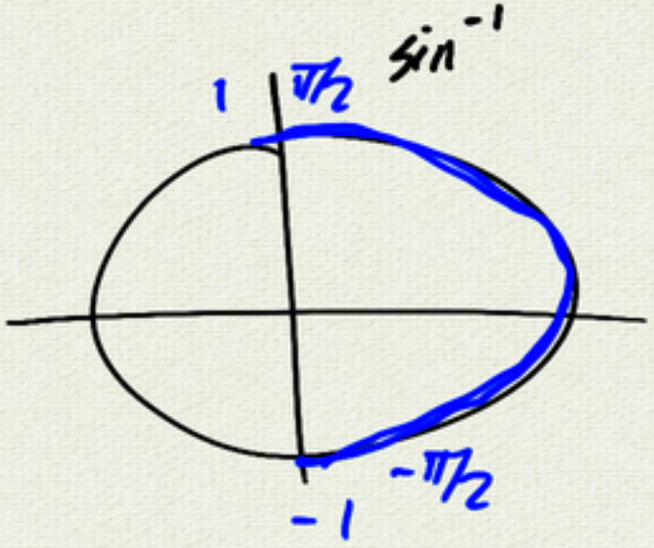
$\cos^{-1}\left(\frac{1}{2}\right) = ?$

$= \pi/3$

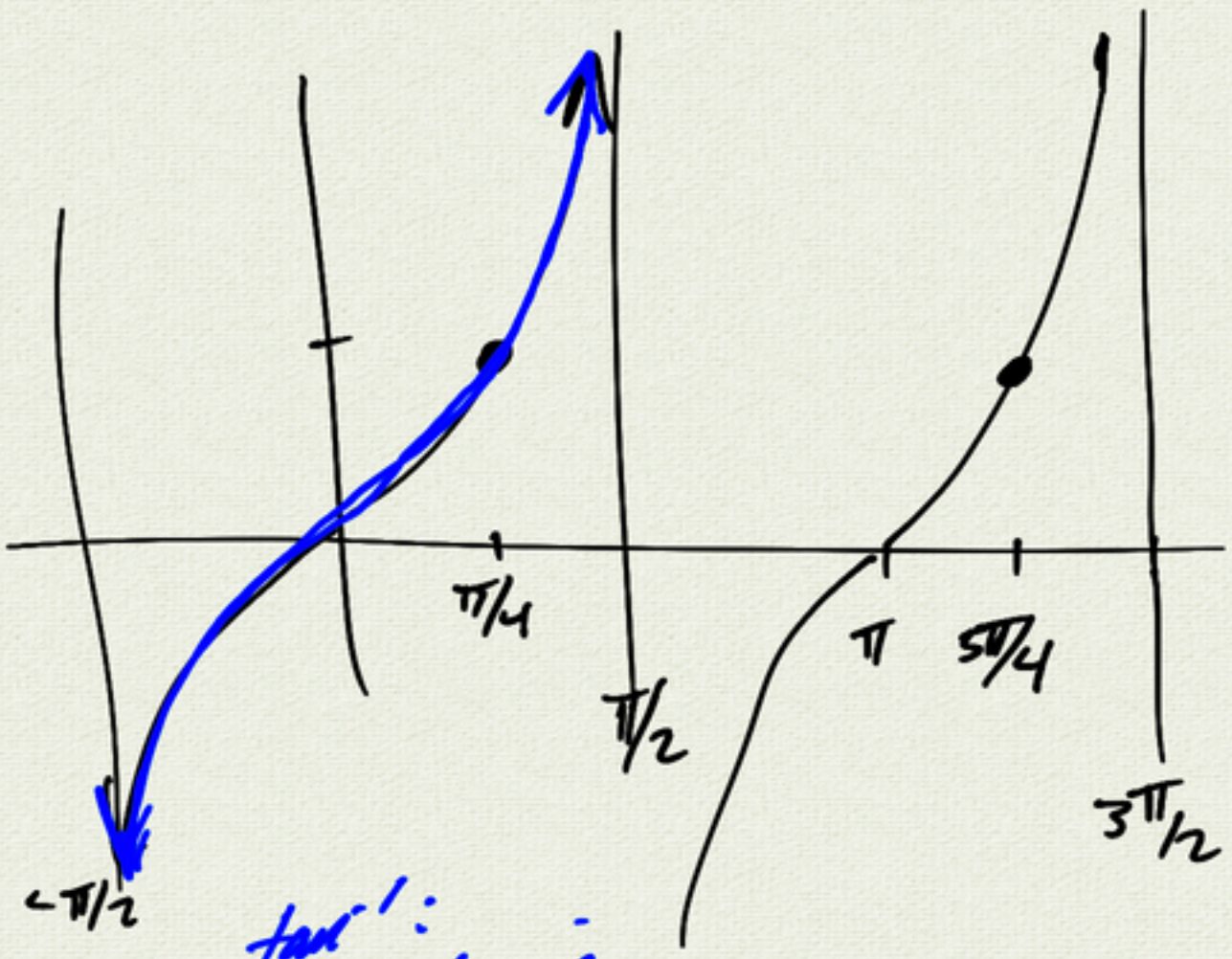




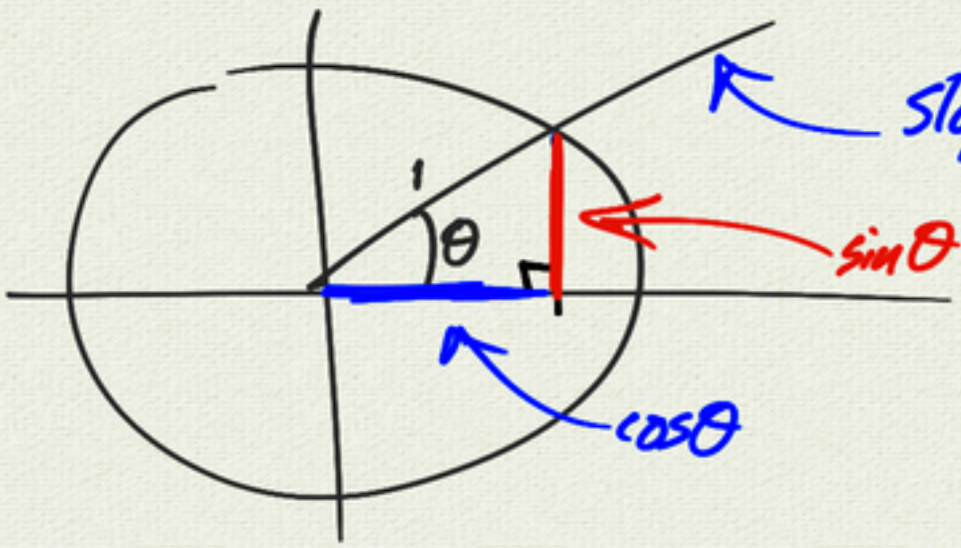
rule for $\cos^{-1}$:
pick value in $[0, \pi]$



$\tan^{-1}(1) = ?$ $(= \pi/4)$



$\tan^{-1}$: choose value in $[-\pi/2, \pi/2]$



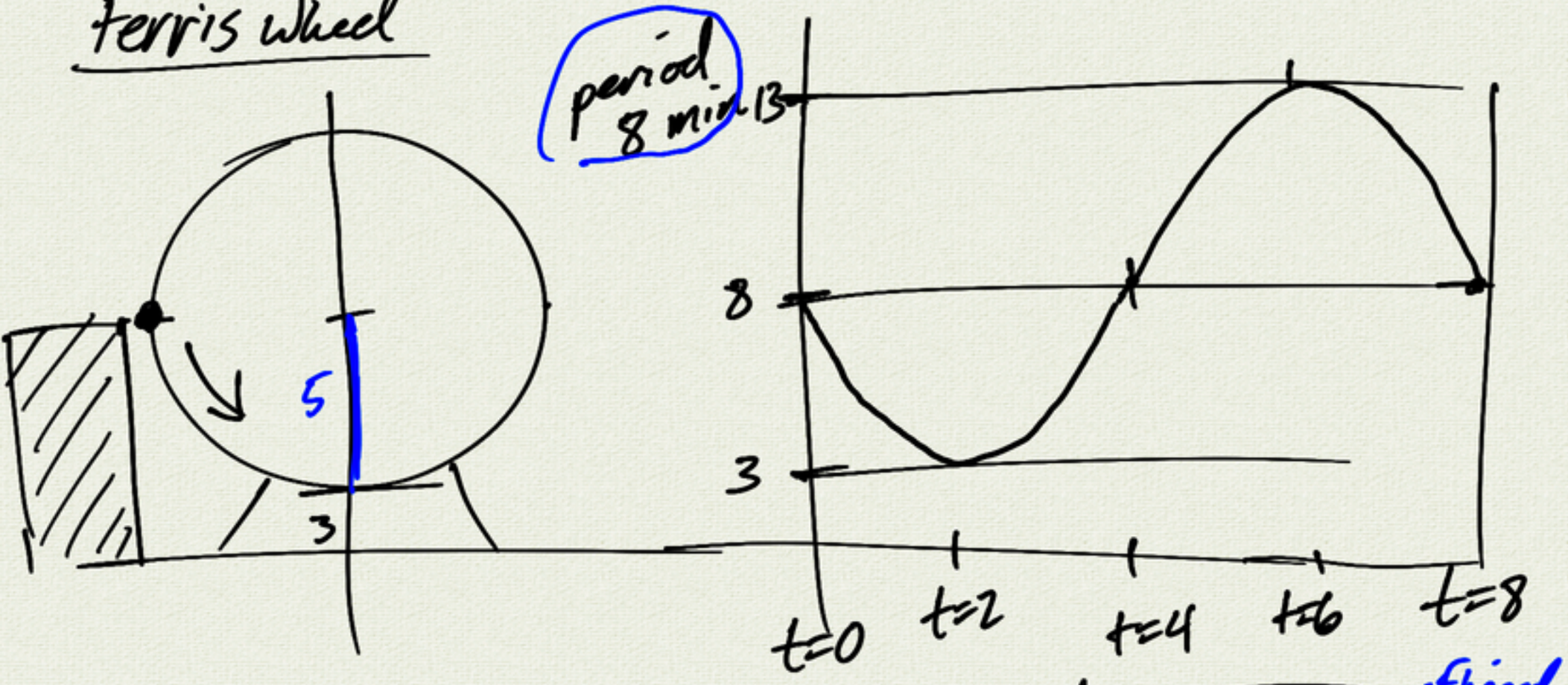
slope of line = ?

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

angle $\xrightarrow{\tan}$ slope

slope $\xrightarrow{\tan^{-1}}$ angle

Ferris wheel



$$h(t) = -5\sin\left(\frac{2\pi}{8}t\right) + 8$$

amplitude 5 ← flipped

vertical shift 8

period $\frac{2\pi}{b} = 8$

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