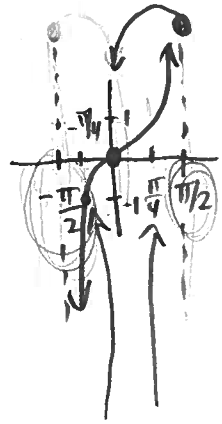
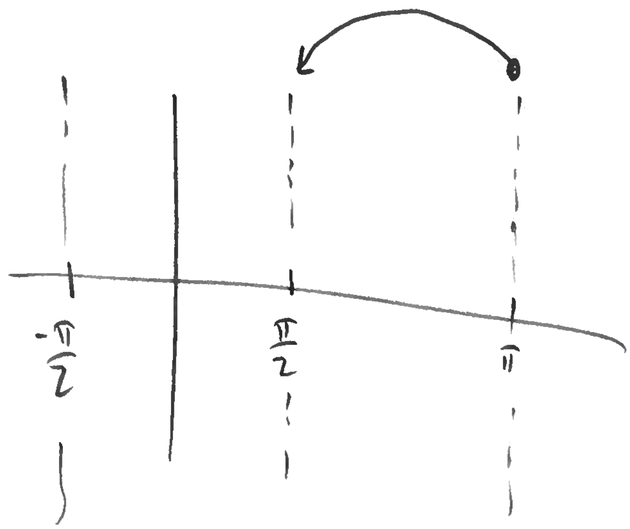
$A\,\text{trig}(B(x-C))+D$

Recall:

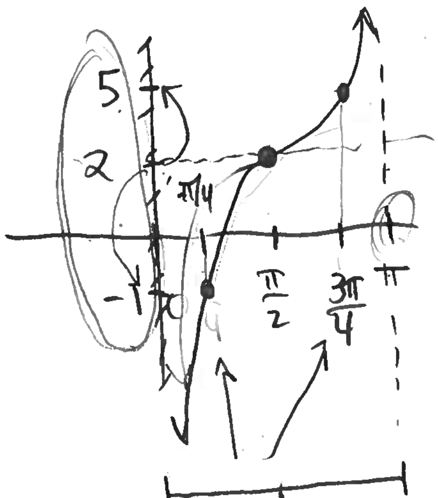


sin & cos

$$per = \frac{2\pi}{B}$$



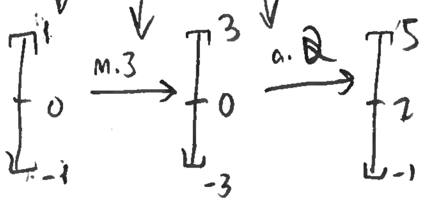
Ex



"A"

$A = 3$

"D" $= 2$



"B" $\quad per = \frac{\pi}{B}$

observed

$\boxed{\text{here: } \pi}$ $\Rightarrow \pi = \frac{\pi}{B}$ (no period change)

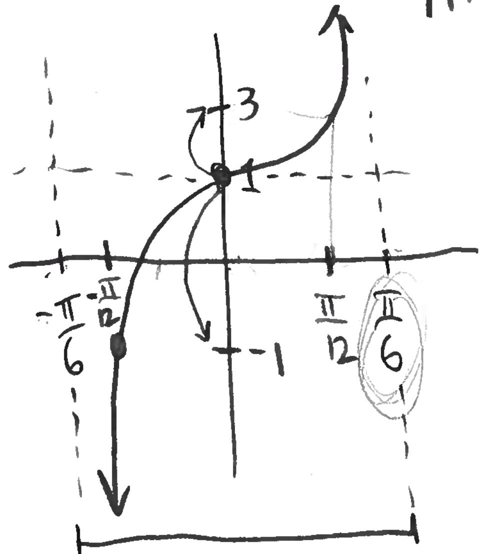
$B = 1$

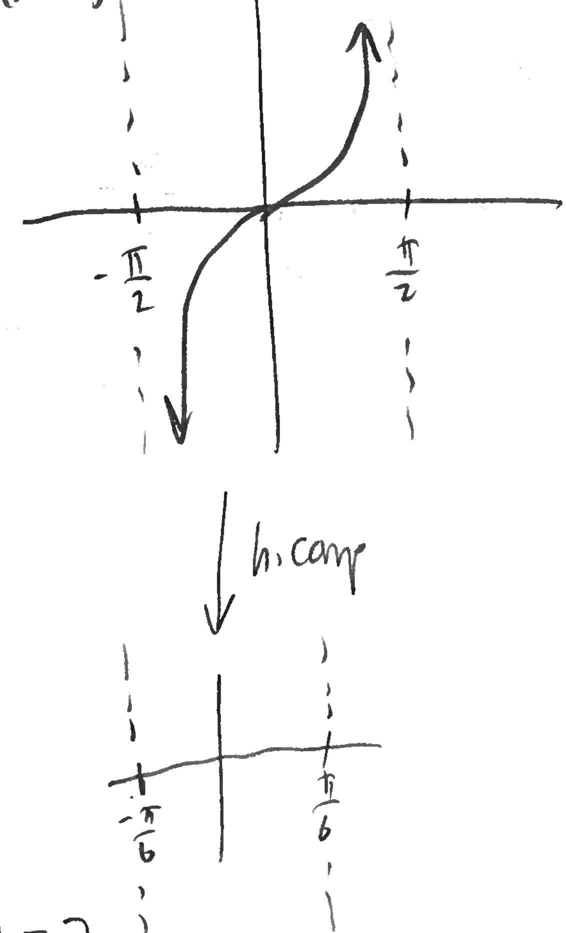
"C"

$C = \frac{\pi}{2}$ b/c the given graph is a h.shift right by $\frac{\pi}{2}$

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

unknown fnct $A\tan(B(x-C))+D$ $\tan(x)$





"D"

y-value of midline: $D=1$

"A"

dist from midline to height of 2nd or 4th anchor pt : $A=2$

"B"

observed per $= \frac{\pi}{B} \Rightarrow \frac{2\pi}{6} = \frac{\pi}{B} \rightarrow \frac{3}{\pi} = \frac{B}{\pi}$
$\rightarrow \boxed{B = \frac{3\pi}{\pi} = 3}$

horiz dist b/w asymptotes

"C"

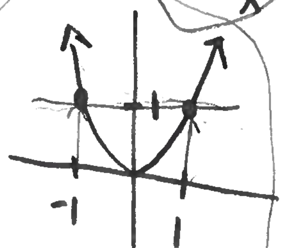
$C=0$ — given graph was not altered horizontally from a regular tangent w/ a h.comp of 3

$\Rightarrow y = 2\tan(3x)+1$

Inverse Trig Functions

$f: \mathbb{R} \to \mathbb{R}$

$f(x) = x^2$



not one-to-one

break domain into pieces

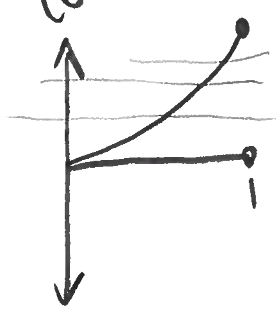
Recall: "one-to-one" functions

→ Special property: two different inputs must have different outputs

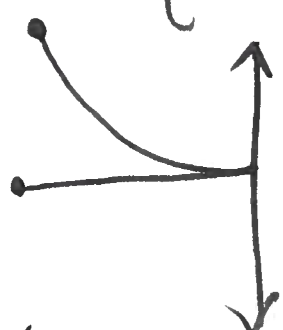
To test: A fnct is one-to-one if it obeys the "horizontal line test"

$$\begin{cases} g: [0,1] \to \mathbb{R} \\ g(x) = x^2 \end{cases}$$

$$\begin{cases} h: [-1,0] \to \mathbb{R} \\ h(x) = x^2 \end{cases}$$



is one-to-one



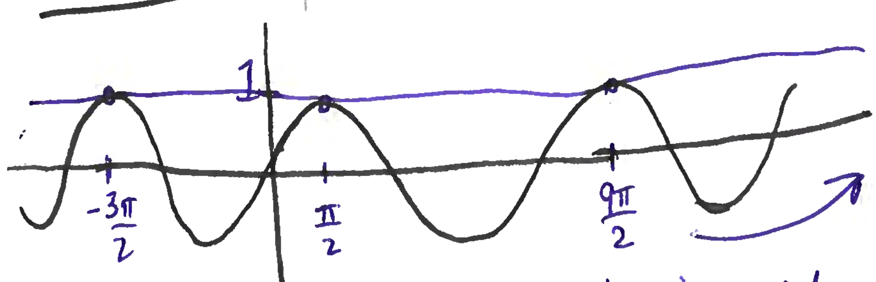
is one-to-one

Theorem: If a function is one-to-one, then it has an inverse function.

PROBLEM

$w: \mathbb{R} \to [-1,1]$

$w(x) = \sin(x)$



∞-many different inputs give output of 1

$\Rightarrow$ w is not one-to-one $\Rightarrow$ cannot say there is an inverse fnct