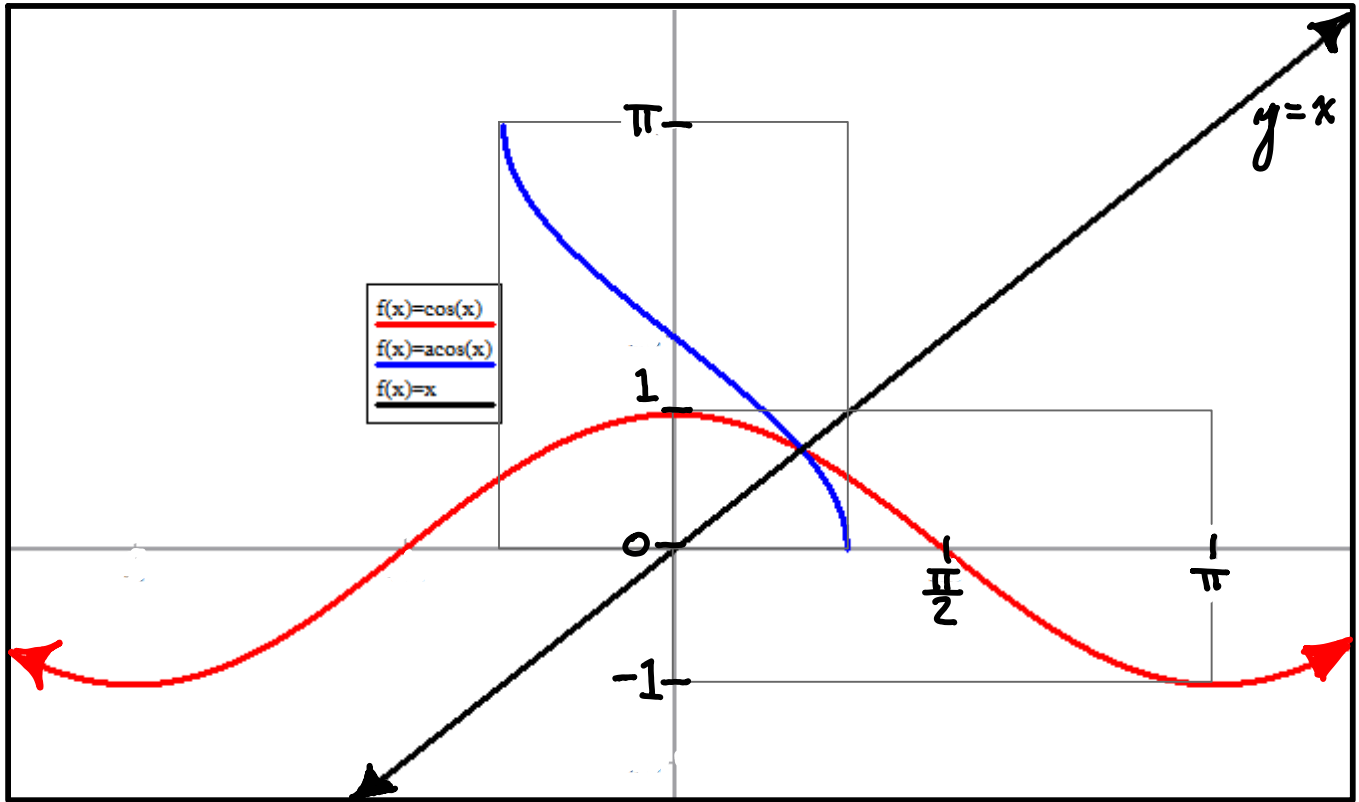


# INVERSE COSINE (ARCCOSINE)

$$\arccos(x) = \text{acos}(x) = \cos^{-1}(x)$$



## DOMAIN AND RANGE OF ARCCOSINE

$$\mathbb{R} \rightarrow \cos(x) \rightarrow [-1, 1] \rightarrow \cos^{-1}(x) \rightarrow [0, \pi] \subset \mathbb{R}$$

FOR WHICH VALUES OF  $x$  DOES:

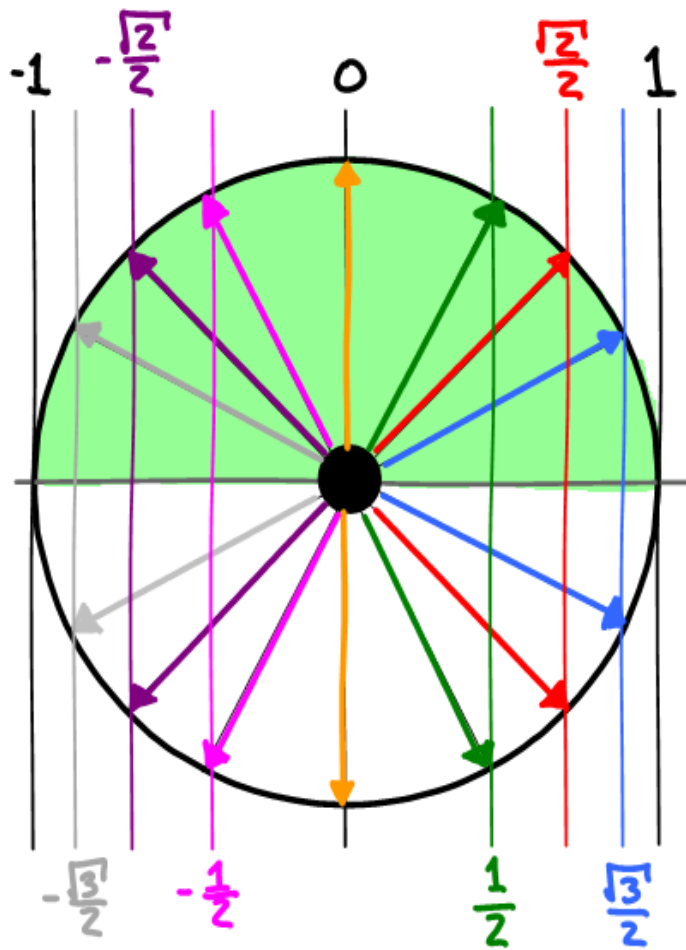
●  $\cos^{-1}(\cos(x)) = x$  ?  $= x$  if  $x \in [0, \pi]$

otherwise you get a different # such that  $\cos(\#) = \cos(x)$

●  $\cos(\cos^{-1}(x)) = x$  ?  $= x$  if  $x \in [-1, 1]$

Otherwise it is undefined.

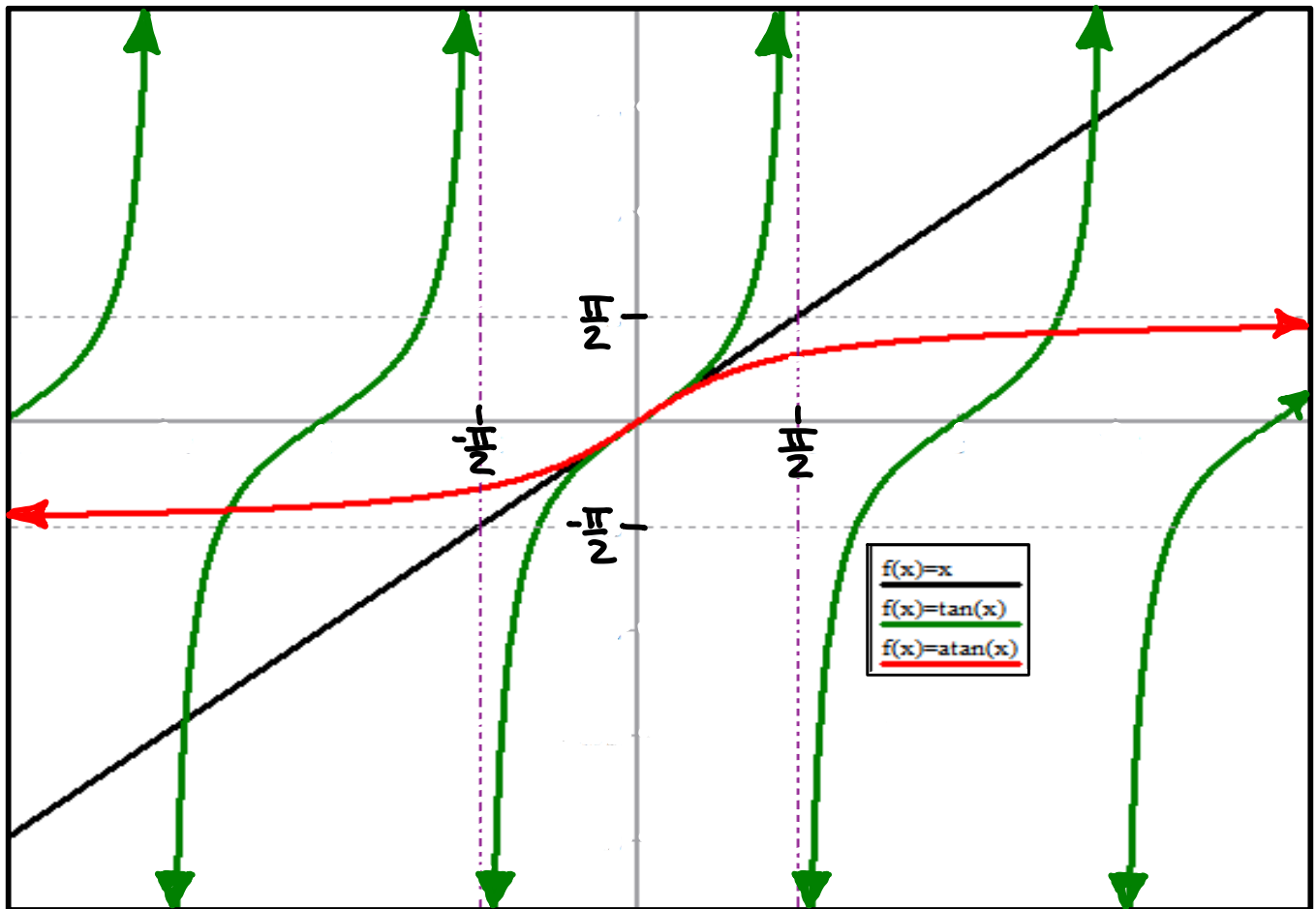
THE **TOP HALF** OF THE UNIT CIRCLE  
IS A MIRROR IMAGE OF  
THE **BOTTOM HALF** OF THE UNIT CIRCLE  
AS FAR AS **COSINE** IS CONCERNED



RANGE OF ARCCOSINE

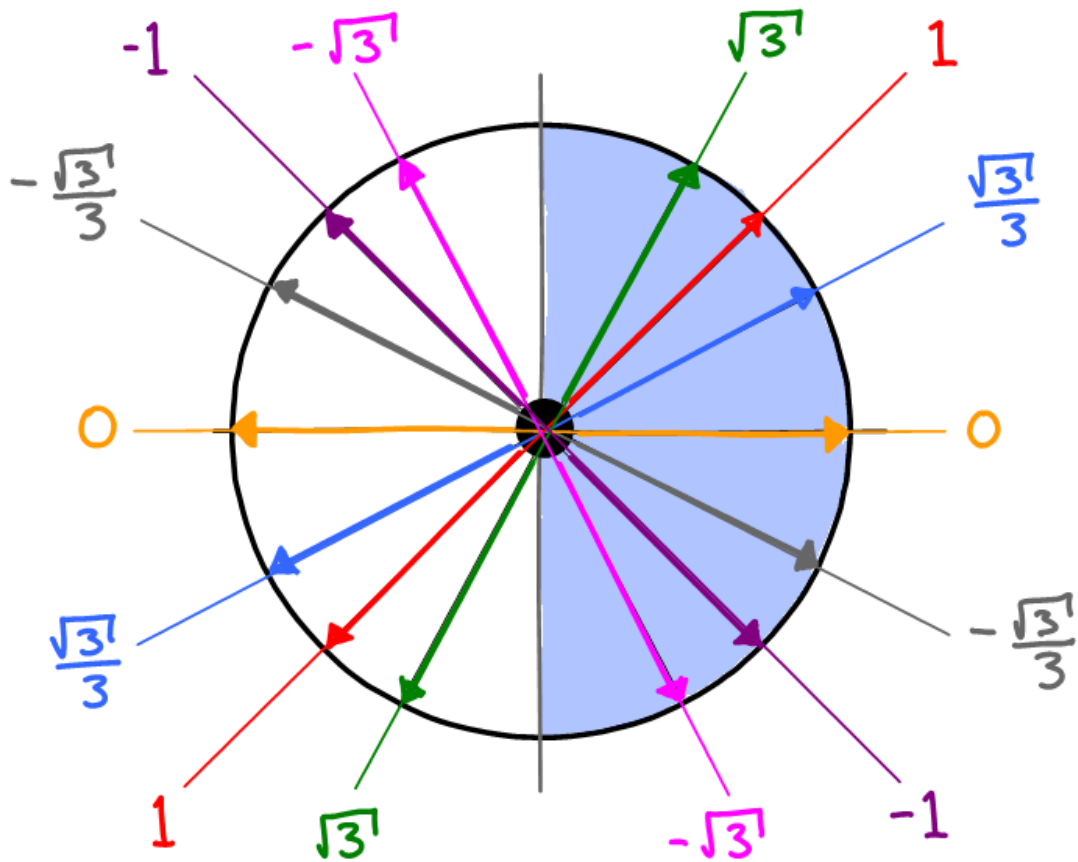
# INVERSE TANGENT (ARCTANGENT)

$$\arctan(x) = \text{atan}(x) = \tan^{-1}(x)$$



$$\mathbb{R} \setminus \left\{ \frac{\pi}{2}(2k+1), k \in \mathbb{Z} \right\} \rightarrow \tan(x) \rightarrow \mathbb{R}$$

$$\left( -\frac{\pi}{2}, \frac{\pi}{2} \right) \leftarrow \tan^{-1}(x)$$



## RANGE OF ARCTAN

FOR WHICH VALUES OF  $x$  DOES:

●  $\arctan(\tan(x)) = x$  ?  $\text{iff } x \in (-\frac{\pi}{2}, \frac{\pi}{2})$

$\text{o/w you get a different } \# \text{ such that } \tan(\#) = \tan(x)$

●  $\tan(\arctan(x)) = x$  ?  $\forall x \in \mathbb{R}$

EVALUATE  $\tan^{-1}(\tan(3\pi/4))$

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EVALUATE  $\tan(\tan^{-1}(-1))$

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EVALUATE

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$$\sin(\tan^{-1}(1))$$

EVALUATE

---

$$\sin(\tan^{-1}(1/2))$$

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EVALUATE

$$\sin(\arccos(-1/3))$$

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- A) Using Pythagorean Identities
  - B) Using Trigonometric ratios
  - C) By drawing and using an appropriate right triangle
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