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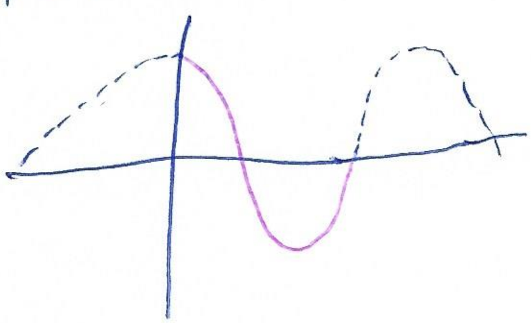
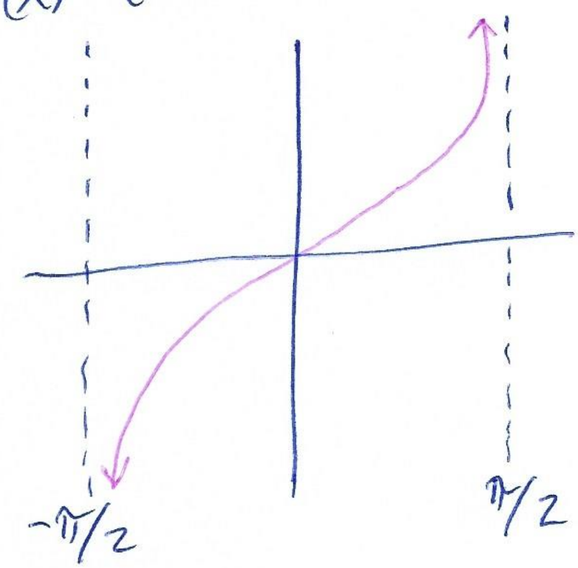
Recall: If $f(x) = \sin(x)$ on $[-\pi/2, \pi/2]$, then $f^{-1}(x) = \arcsin(x)$

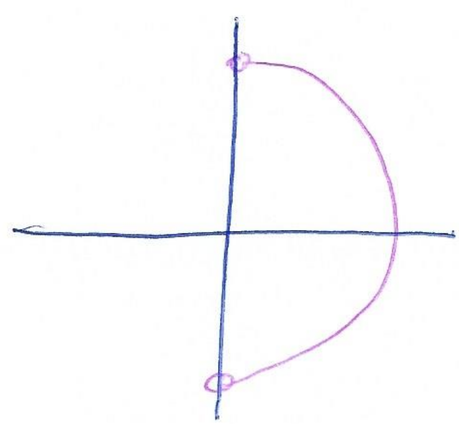
Ex: Define $\arccos(x)$ and $\arctan(x)$

$f(x) = \cos(x)$ on $[0, \pi]$



$f(x) = \tan(x)$ on $(-\pi/2, \pi/2)$





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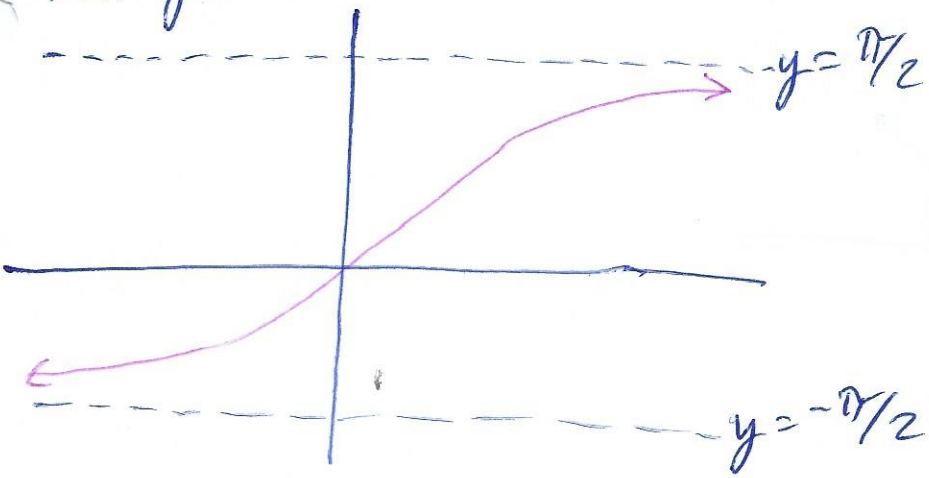
Ex: $y = \arctan(x)$



How "should" we think of arccsc(x) and arcsec(x)?

$\operatorname{arccsc}(x) = \arcsin(1/x)$

$\operatorname{arcsec}(x) = \arccos(1/x)$

$$\operatorname{arccot}(x) = \begin{cases} \arctan(1/x) & , \text{ for } x > 0 \\ \arctan(1/x) + \pi & , \text{ for } x < 0 \\ \pi/2 & , \text{ for } x = 0 \end{cases}$$

Ex: $\operatorname{arccot}(-\sqrt{3}) = \pi + \arctan\left(\frac{1}{-\sqrt{3}}\right)$

$= \pi + \arctan\left[\frac{(-1/2)}{(\sqrt{3}/2)}\right]$

$= \pi + (-\pi/6)$

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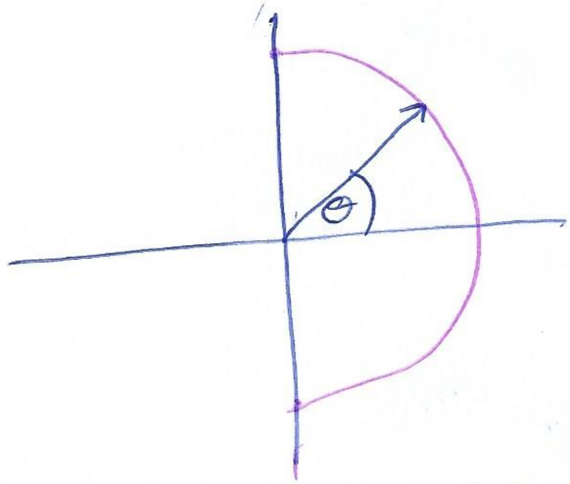
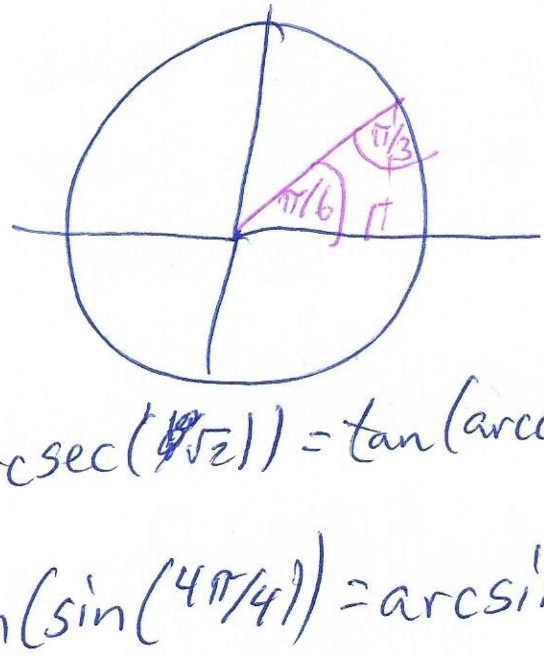
Ex: $\operatorname{arccot}(2) = \arctan(1/2)$



Ex: $\sin(\arctan(0)) = \sin(0) = 0$

Ex: $\arcsin(\cos(\pi/6)) = \arcsin(\sqrt{3}/2) = \pi/3$

~~Ex:~~



Ex: $\tan(\operatorname{arcsec}(\sqrt{2})) = \tan(\arccos(1/\sqrt{2})) = \tan(\pi/4) = 1$

Ex: $\arcsin(\sin(4\pi/4)) = \arcsin\left(\frac{\sqrt{3}}{2}\right) = -\pi/3$