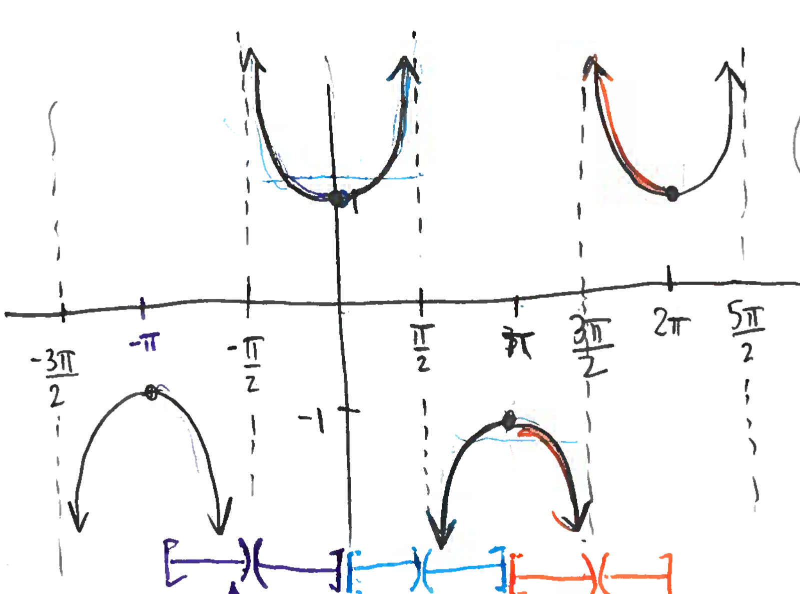
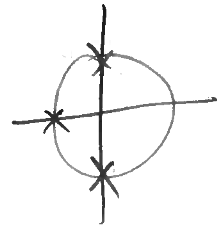
$\sec(x) = \frac{1}{\cos(x)}$



$[-\pi, -\frac{\pi}{2})$

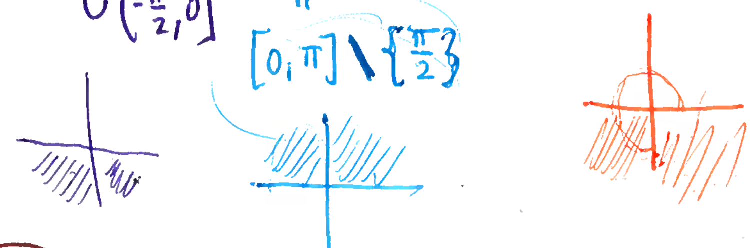
$\cup (-\frac{\pi}{2}, 0]$

$[0, \frac{\pi}{2}) \cup (\frac{\pi}{2}, \pi]$

$=$

$[0, \pi] \setminus \{\frac{\pi}{2}\}$

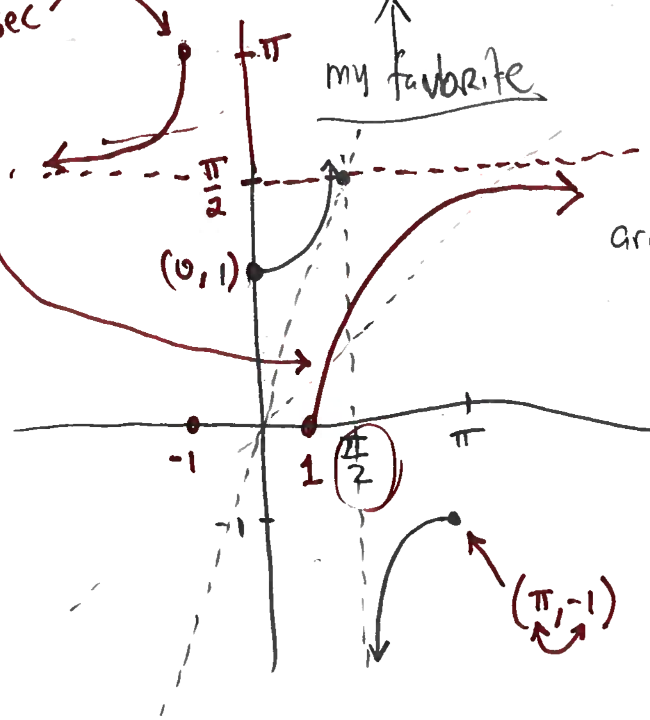
$[\pi, \frac{3\pi}{2}) \cup (\frac{3\pi}{2}, 2\pi]$



my favorite

arcsec

$\frac{\pi}{2} \approx 1.5$



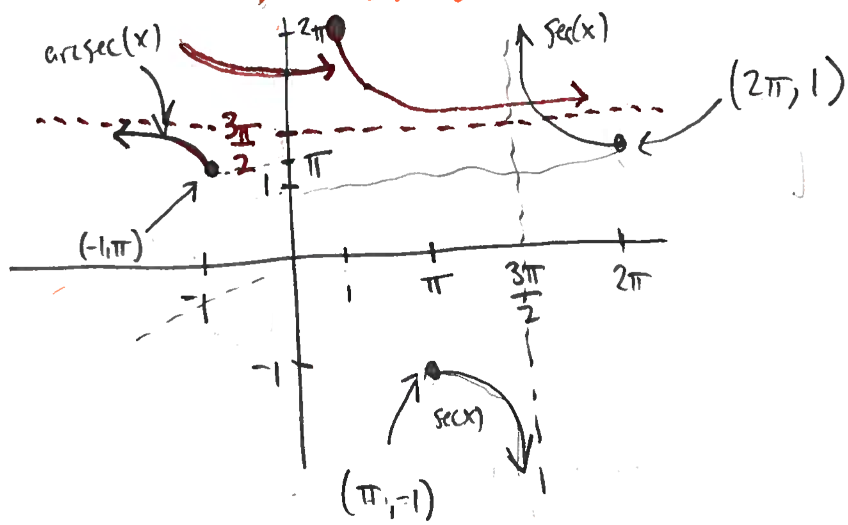

our dom restr

$\sec: [0, \frac{\pi}{2}) \cup (\frac{\pi}{2}, \pi] \to (-\infty, -1] \cup [1, \infty)$

$\text{arcsec}: (-\infty, -1] \cup [1, \infty) \to [0, \frac{\pi}{2}) \cup (\frac{\pi}{2}, \pi]$

What if we instead took domain restriction

$\sec: [\pi, \frac{3\pi}{2}) \cup (\frac{3\pi}{2}, 2\pi] \to (-\infty, -1] \cup [1, \infty)$




$\operatorname{arcsec}: (-\infty, -1] \cup [1, \infty) \to [\pi, \frac{3\pi}{2}) \cup (\frac{3\pi}{2}, 2\pi]$

cosine — takes angle as input

$\boxed{\text{arctan — gives an angle as output}}$

Ex: $\cos\left(\arctan\left(\frac{1}{10}\right)\right)$

can't use unit circle

Soln: Let $\theta = \arctan\left(\frac{1}{10}\right)$

$\tan\theta = \cancel{\tan}\left(\cancel{\arctan}\left(\frac{1}{10}\right)\right)$

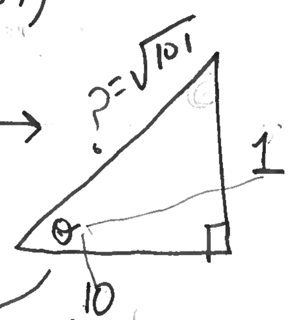
annihilate

$\boxed{\tan\theta = \frac{1}{10}}$

$\boxed{\text{I want } \cos(\theta).}$

$$\frac{\frac{1}{\sqrt{101}}}{\frac{10}{\sqrt{101}}}$$

$$\frac{\sin\theta}{\cos\theta} = \tan\theta = \frac{1}{10}$$




Pyth thm

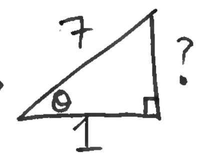
$10^2 + 1^2 = ?^2 \rightarrow ? = \sqrt{101}$

So,

$$\cos\left(\arctan\left(\frac{1}{10}\right)\right) = \cos(\theta) = \frac{10}{\sqrt{101}}$$

Ex: $\csc\left(\arccos\left(\frac{1}{7}\right)\right)$

$\theta = \arccos\left(\frac{1}{7}\right) \rightarrow \cos\theta = \frac{1}{7} \rightarrow$




$\rightarrow 1^2 + ?^2 = 7^2$

$\rightarrow ? = \sqrt{48}$

48
2 24
2 12
2 6
2 3

$\sqrt{48} = \sqrt{2\cdot 2\cdot 2\cdot 2\cdot 3}$
$= 4\sqrt{3}$

Therefore,

$\frac{\text{hyp}}{\text{opp}}$

$$\csc\left(\arccos\left(\frac{1}{7}\right)\right) = \csc(\theta) = \frac{7}{\sqrt{48}}$$