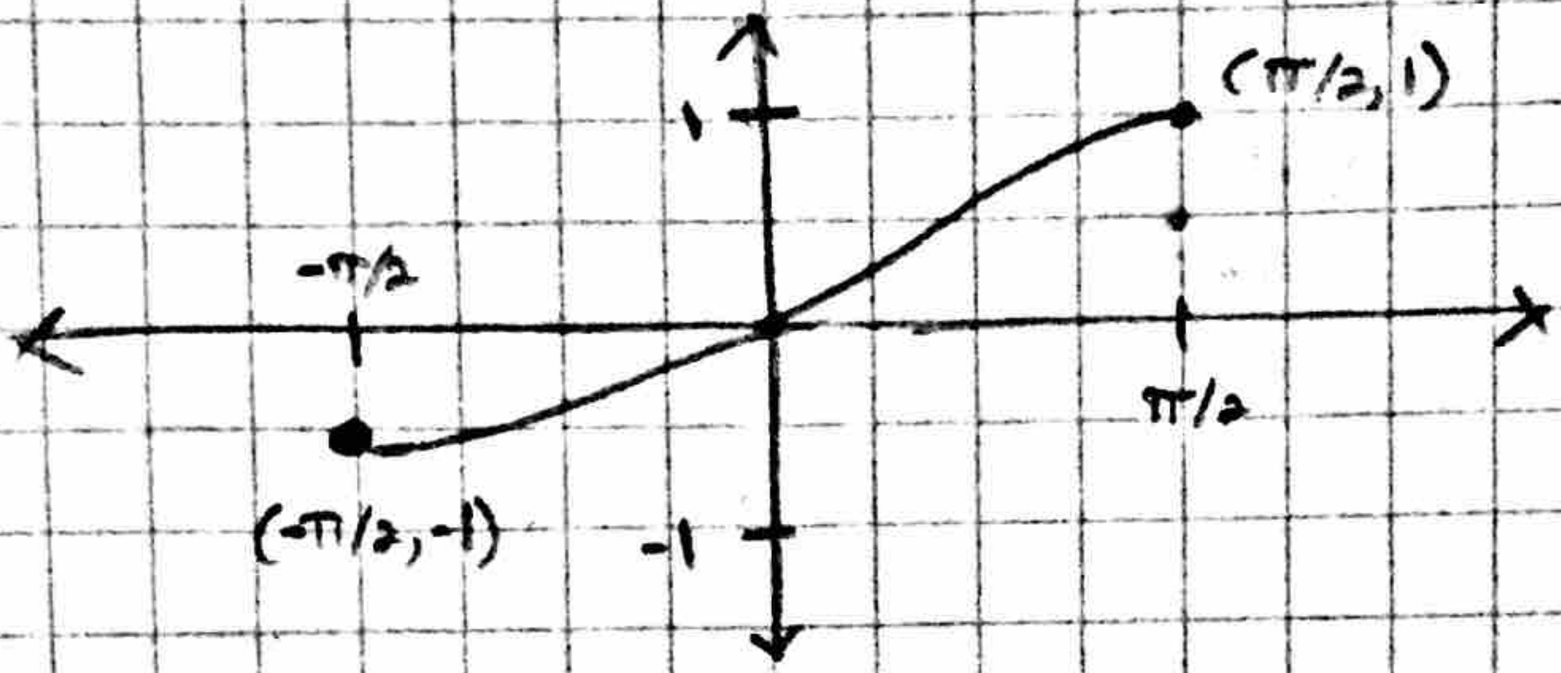
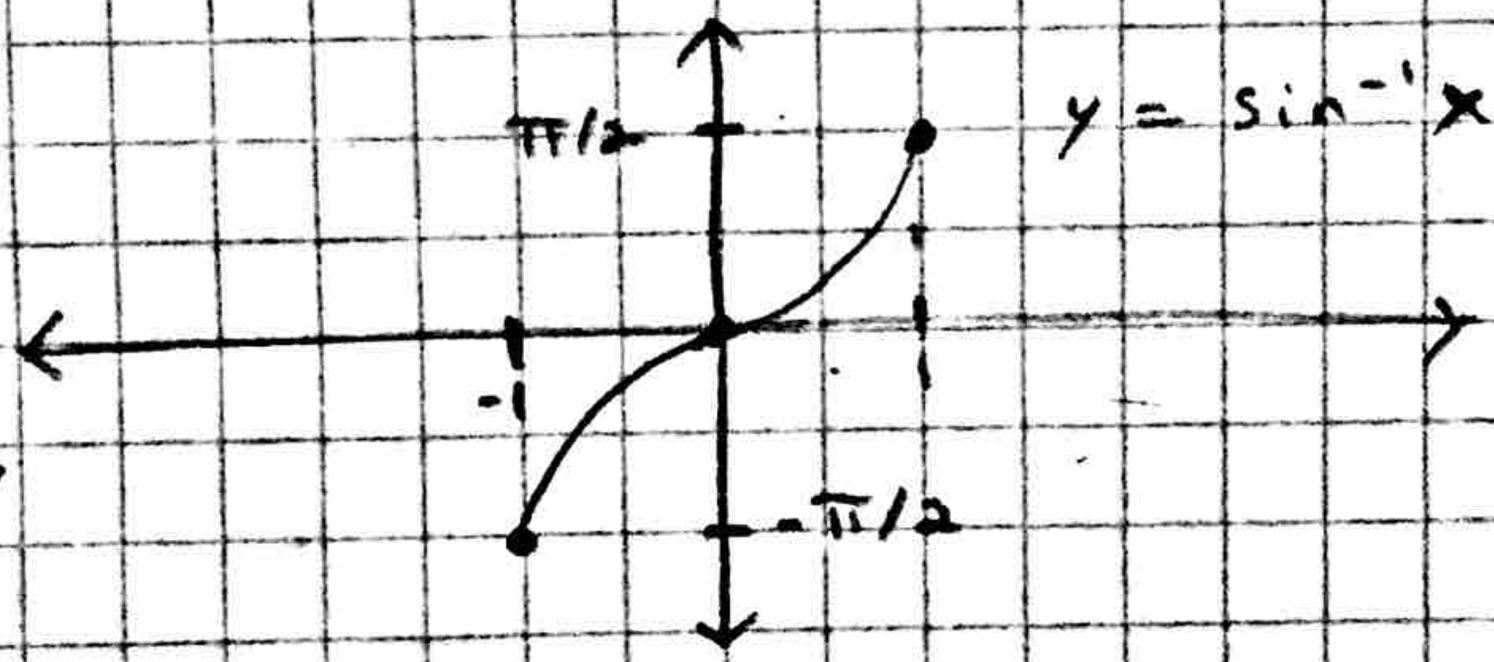
Sine Graph



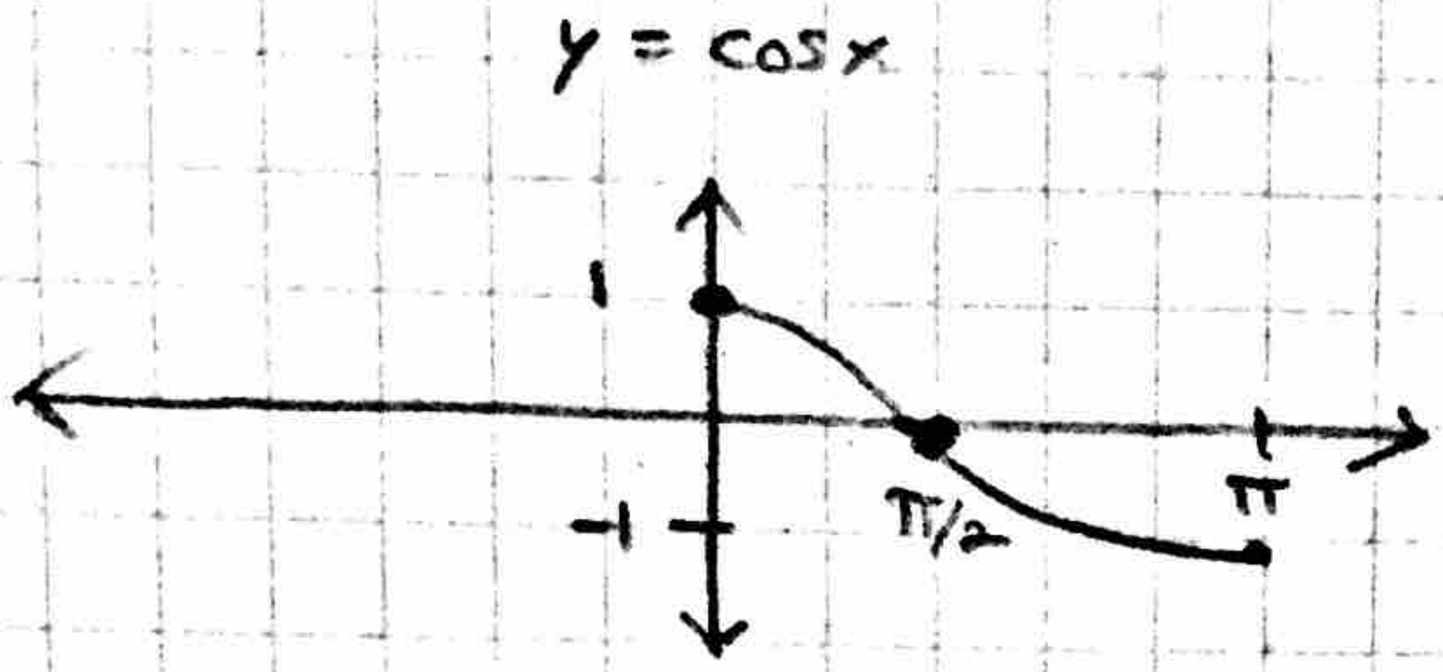
Inverse Graph

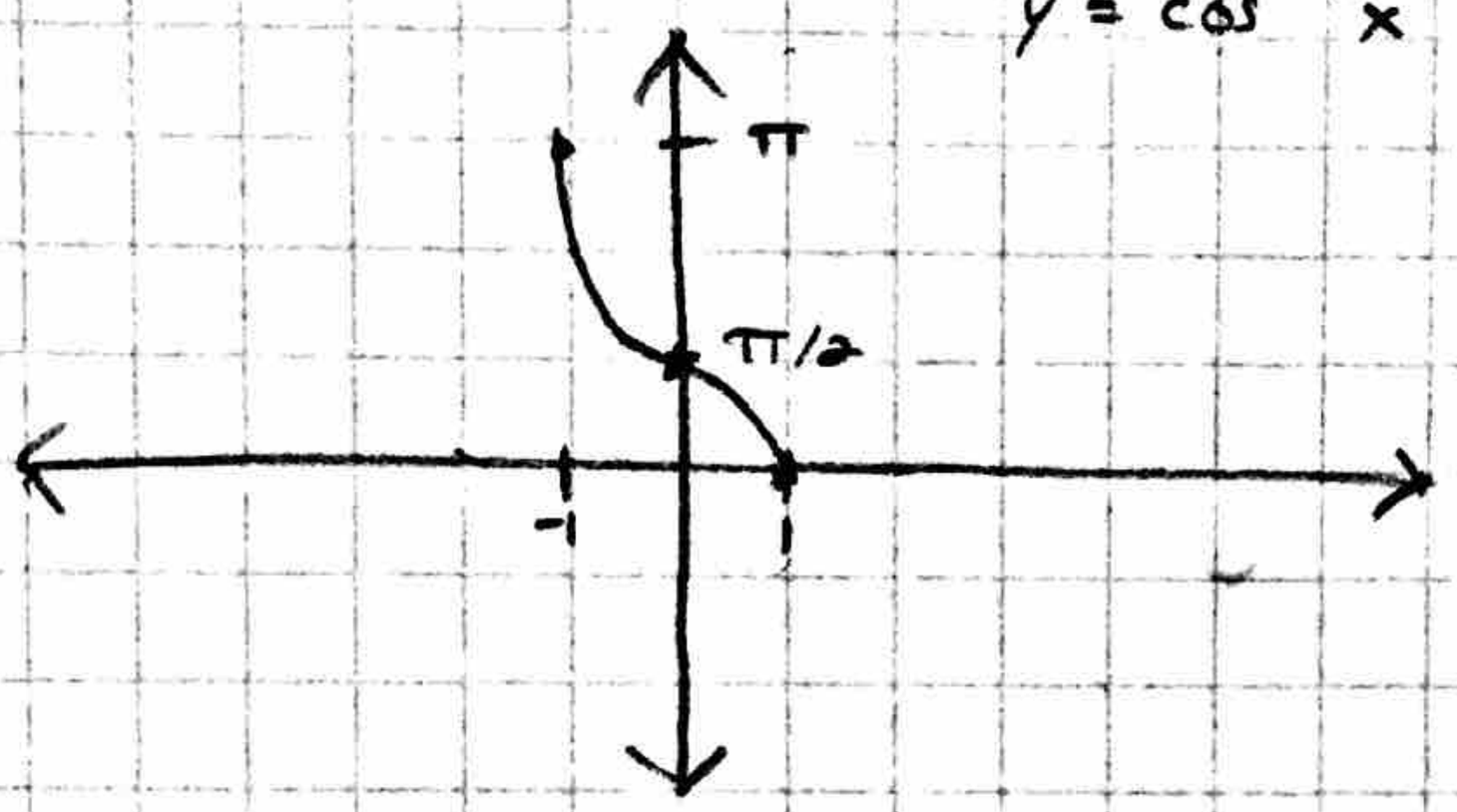


$\sin^{-1} x = y \leftrightarrow \sin y = x \quad \left(-\pi/2 \le y \le \pi/2\right)$

$\sin^{-1}(\sin x) = x \quad ; \; -\pi/2 \le x \le \pi/2$

$\sin(\sin^{-1} x) = x \quad ; \; -1 \le x \le 1$





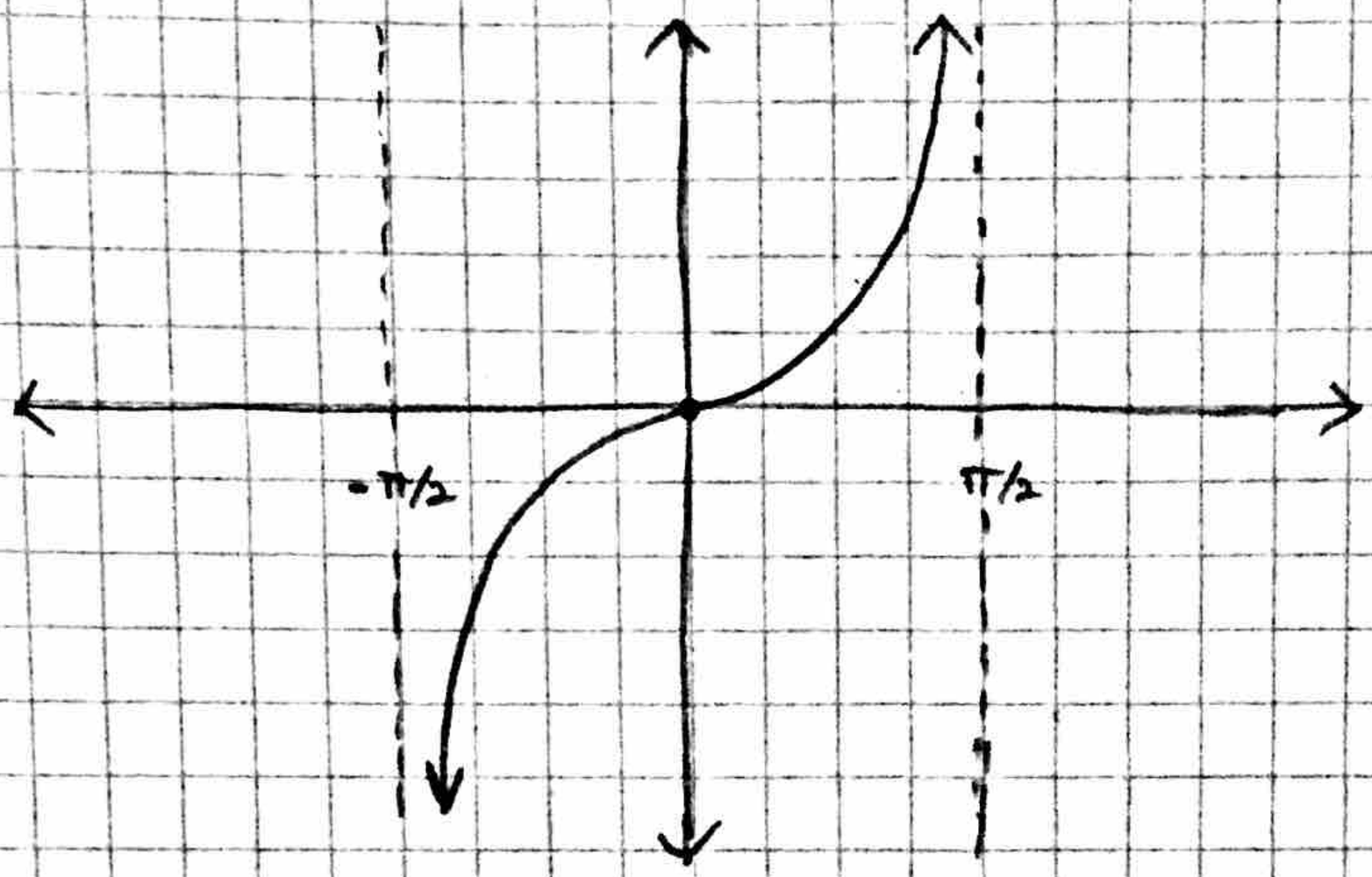
$\cos^{-1} x = y \quad \longleftrightarrow \quad \cos y = x$

$0 \le y \le \pi$ (so that cosine is 1-1)

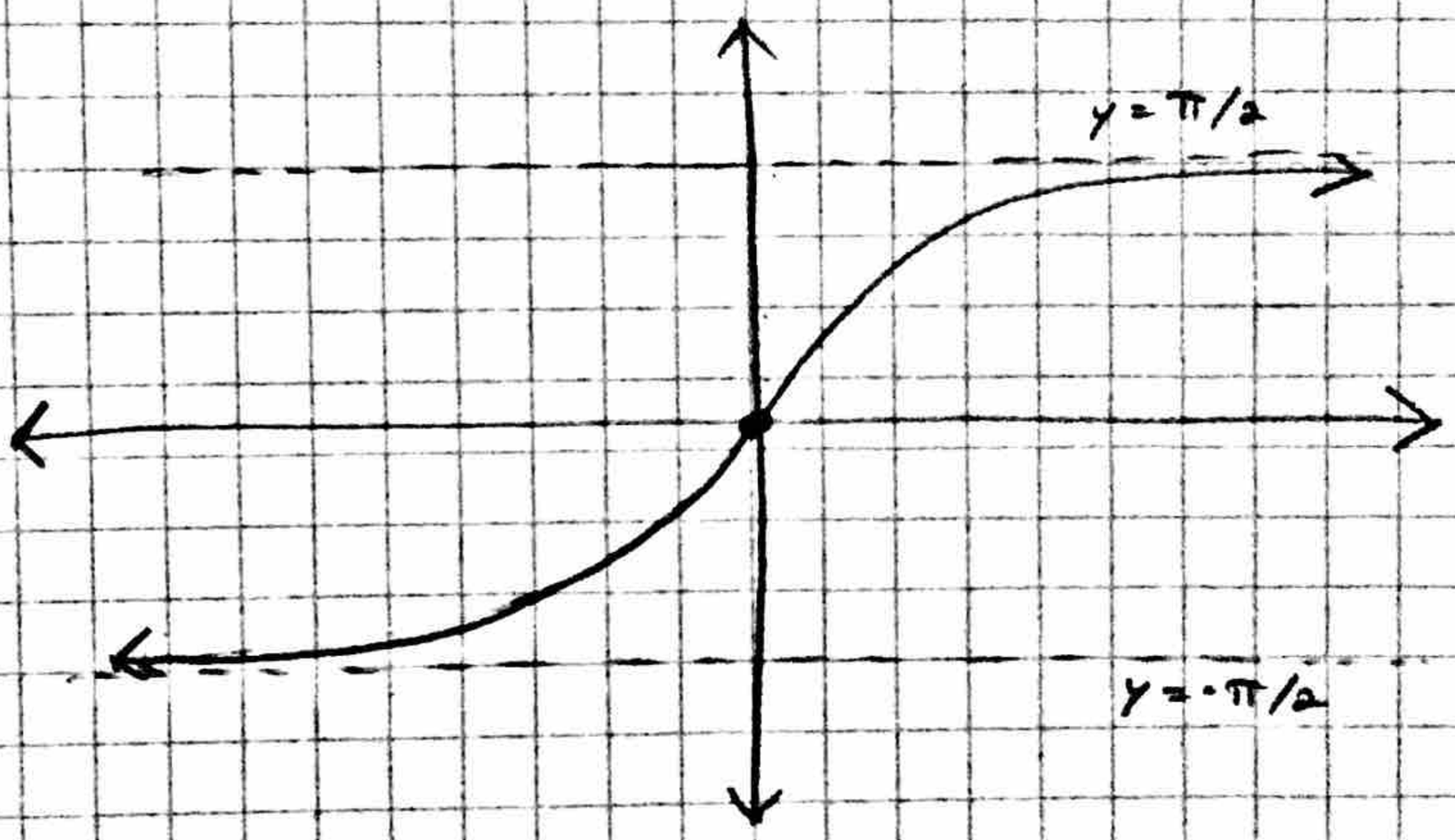
$\cos^{-1}(\cos x) = x, \quad 0 \le x \le \pi$

$\cos(\cos^{-1} x) = x, \quad -1 \le x \le 1$

$y = \tan x$



$y = \tan^{-1} x$



$\tan^{-1} x = y \leftrightarrow \tan(y) = x, \quad -\pi/2 < y < \pi/2$

$\lim_{x \to \infty} \tan^{-1} x = \pi/2$ → as x approaches infinity, arc tan approaches $\pi/2$

Describing horizontal asymptotes

$\lim_{x \to -\infty} \tan^{-1} x = -\pi/2$ → as x approaches negative infinity, the y value of arctan approaches $-\pi/2$