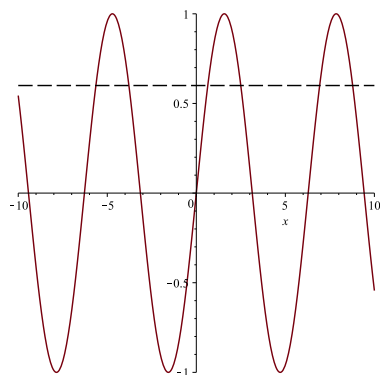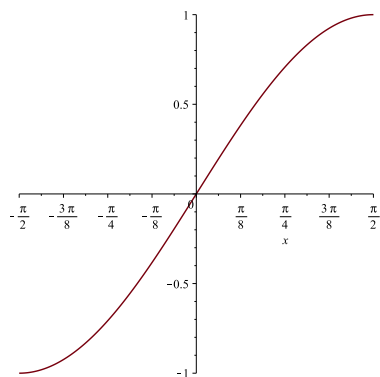Remember that the function $y = \sin x$ is not invertible on $-\infty < x < \infty$

To define an inverse we need to restrict x to range between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$.
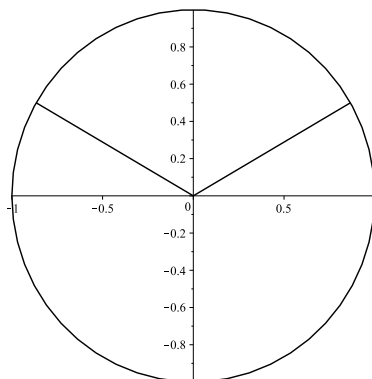

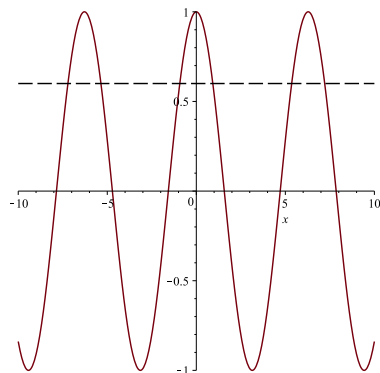Therefore $arcsin(x)$ returns an angle between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$.

Given a value y between -1 and 1, how many angles α are there such that $\sin \alpha = y$?
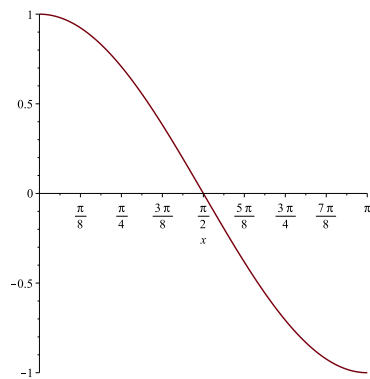
Infinitely many. All the angles

$$arcsin(y) + 2\pi k \text{ and } \pi - arcsin(y) + 2\pi k$$

Remember that the function $y = \cos x$ is not invertible on $-\infty < x < \infty$

To define an inverse we need to restrict x to range between 0 and π.

Therefore $arccos(x)$ returns an angle between 0 and π.

Given a value y between -1 and 1, how many angles α are there such that $\cos \alpha = y$?

Infinitely many. All the angles

$$arccos(y) + 2\pi k \text{ and } -arccos(y) + 2\pi k$$