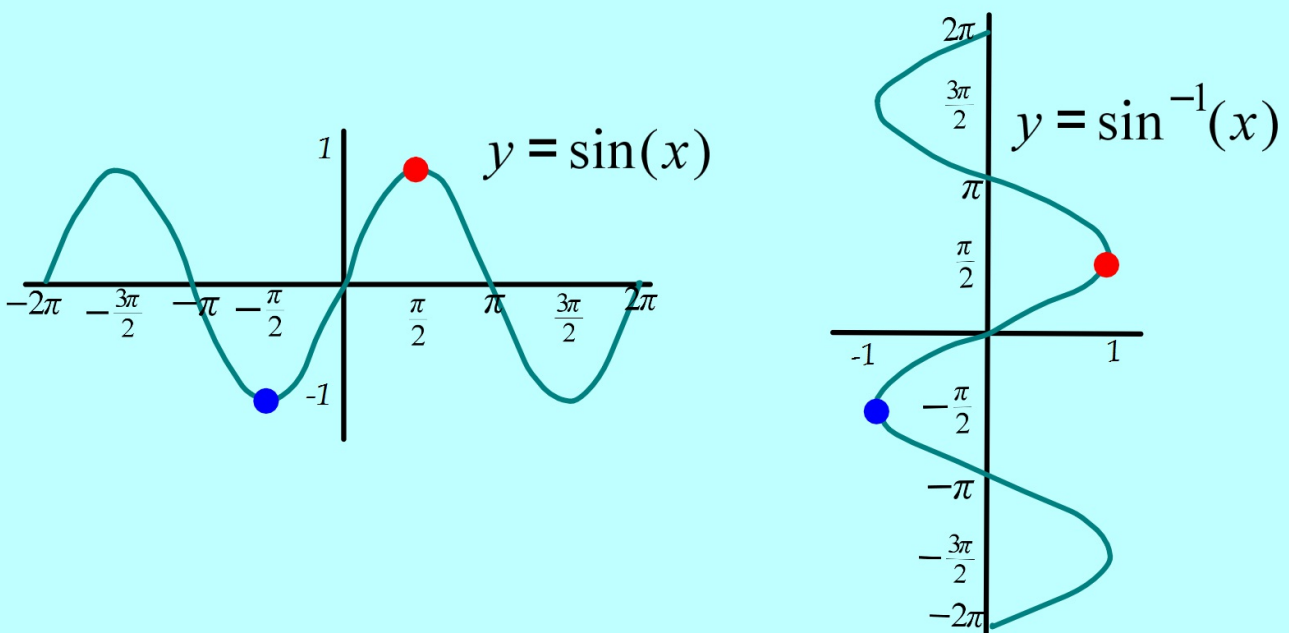


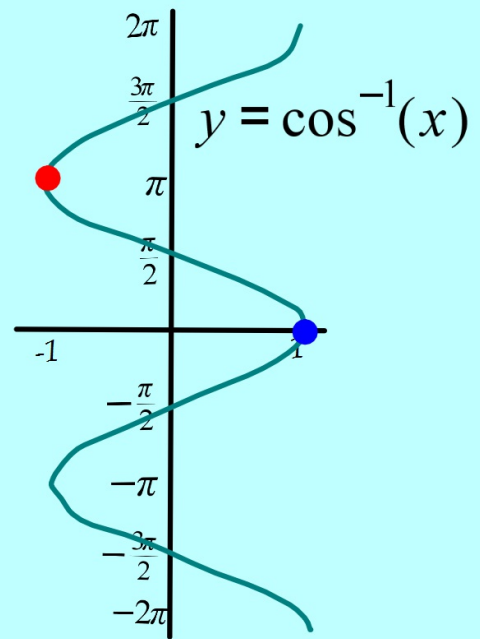
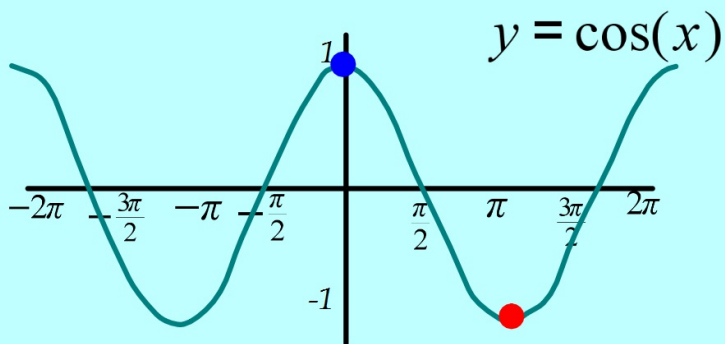
Functions

Inverse Trigonometric Functions

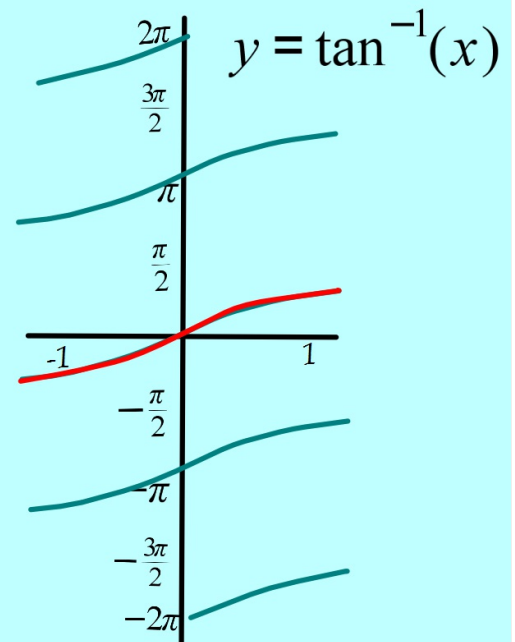
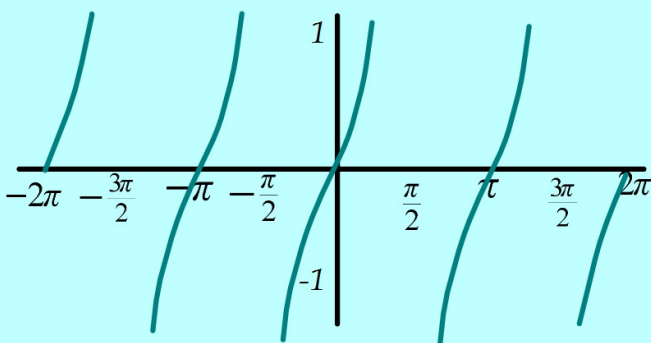
Draw graphs of $\sin x$, $\cos x$ and $\tan x$ plus their inverses.

Use the fact that $(x, y) \in f(x) \Rightarrow (y, x) \in f^{-1}(x)$





$y = \tan(x)$



Note

Domains need to be restricted in order to meet definition of a function.

<u>Function</u>	<u>Inverse Function</u>	<u>Domain of f^{-1}</u>	<u>Range of f^{-1}</u>
$y = \sin x$	$y = \sin^{-1} x$	$-1 \leq x \leq 1$	$-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$
$y = \cos x$	$y = \cos^{-1} x$	$-1 \leq x \leq 1$	$0 \leq y \leq \pi$
$y = \tan x$	$y = \tan^{-1} x$	$x \in \mathbb{R}$	$-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$

Note

$\sin^{-1}(x)$ is read "angle whose sine is x "
or "inverse sine x "

Exercise

- 1** $\sin^{-1}(-1) = \underline{\underline{-\frac{\pi}{2}}}$
2 $\cos^{-1}(0) = \underline{\underline{\frac{\pi}{2}}}$
3 $\tan^{-1}(-1) = \underline{\underline{-\frac{\pi}{4}}}$
- 4** $\cos^{-1}\left(\frac{1}{2}\right) = \underline{\underline{\frac{\pi}{3}}}$
5 $\sin^{-1}\left(-\frac{1}{2}\right) = \underline{\underline{-\frac{\pi}{6}}}$
6 $\tan^{-1}(\sqrt{3}) = \underline{\underline{\frac{\pi}{3}}}$
- 7** $\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right) = \underline{\underline{-\frac{\pi}{6}}}$
8 $\cos^{-1}\left(-\frac{1}{\sqrt{2}}\right) = \underline{\underline{\frac{3\pi}{4}}}$
9 $\sin^{-1}\left(-\frac{1}{\sqrt{2}}\right) = \underline{\underline{-\frac{\pi}{4}}}$
- 10** $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \underline{\underline{\frac{\pi}{3}}}$
11 $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \underline{\underline{\frac{5\pi}{6}}}$