

Domain and Range of Trig and Inverse Trig Functions



Preliminaries and Objectives

Preliminaries:

- Graphs of $y = \sin x$, $y = \cos x$ and $y = \tan x$.

Objectives:

- Find the domain and range of basic trig and inverse trig functions.

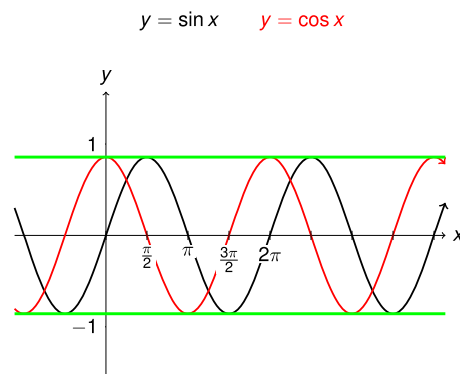
Domain and Range of General Functions

- The **domain** of a function is the list of all possible inputs (x -values) to the function.
- The **range** of a function is the list of all possible outputs (y -values) of the function.
- Graphically speaking, the domain is the portion of the x -axis on which the graph casts a shadow.
- Graphically speaking, the range is the portion of the y -axis on which the graph casts a shadow.

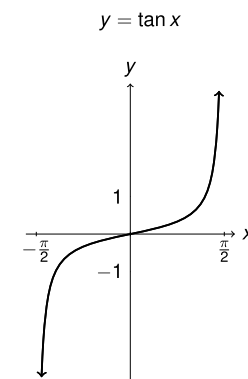
Domain and Range

Function	Domain	Range
$y = \sin(x)$	$-\infty < x < \infty$	$-1 \leq y \leq 1$
$y = \cos(x)$	$-\infty < x < \infty$	$-1 \leq y \leq 1$
$y = \tan(x)$	$x \neq \dots -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \dots$	$-\infty < y < \infty$
$y = \sin^{-1}(x)$	$-1 \leq x \leq 1$	$-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$
$y = \cos^{-1}(x)$	$-1 \leq x \leq 1$	$0 \leq y \leq \pi$
$y = \tan^{-1}(x)$	$-\infty < x < \infty$	$-\frac{\pi}{2} < y < \frac{\pi}{2}$

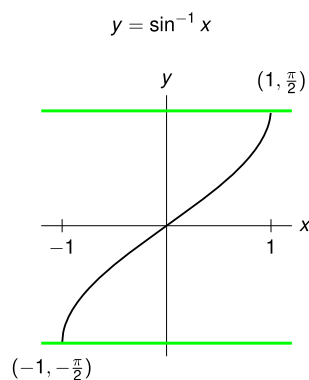
Domain, Range and Graphs



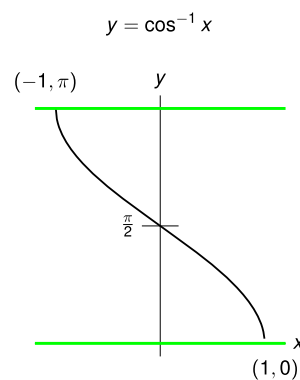
Domain, Range and Graphs



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