

Functions: domain and range.

Make sure you know the shape of the graph of each of these functions (except the polynomials and rational functions, as there is no general shape for their graph).

Name	Formula / symbol	Domain	Range
Polynomial	$a_n x^n + \dots a_1 x + a_0$	\mathbb{R}	It depends
Linear function	$ax + b$	\mathbb{R}	\mathbb{R} unless $a = 0$
Power function	x^n	\mathbb{R}	\mathbb{R} if n is odd. $[0, \infty)$ if n is even
Rational functions	$\frac{P(x)}{Q(x)}$ with $P(x)$ and $Q(x)$ polynomials	x such that $Q(x) \neq 0$	It depends!
Root functions	$\sqrt[n]{x}$	\mathbb{R} if n is odd. $[0, \infty)$ if n is even.	\mathbb{R} if n is odd. $[0, \infty)$ if n is even.
Exponential	e^x	\mathbb{R}	$(0, \infty)$
Logarithm	$\ln(x)$	$(0, \infty)$	\mathbb{R}
Sine	$\sin x$	\mathbb{R}	$[-1, 1]$
Arcsine	$\arcsin x$	$[-1, 1]$	$[-\pi/2, \pi/2]$
Cosine	$\cos x$	\mathbb{R}	$[-1, 1]$
Arccosine	$\arccos x$	$[-1, 1]$	$[0, \pi]$
Tangent	$\tan x$	$x \neq \pi/2 + k\pi$ for $k \in \mathbb{Z}$	\mathbb{R}
Arctangent	$\arctan x$	\mathbb{R}	$(-\pi/2, \pi/2)$