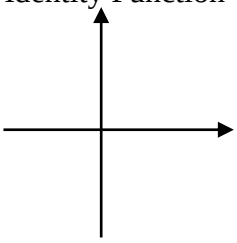
Library of Functions

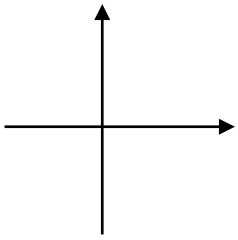
This worksheet reviews the graphs of basic families of functions that students learned about in beginning and intermediate algebra (and precalculus). For each function, sketch the graph , state the domain and range, and identify any asymptotes. Save this for reference to review the properties of these families of functions..

Linear Functions & Equations

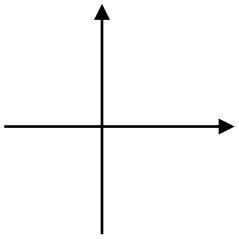
$y = x$ Identity Function



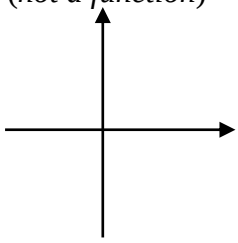
$y = -x$



$y = c$ Constant Function

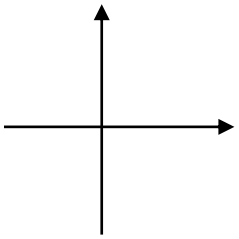


$x = c$ (*not a function*)



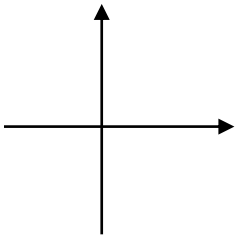
Absolute Value Function

$y = |x| = \text{abs}(x)$

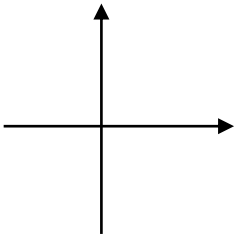


Power Funtions: Even Integer Powers of x

$y = x^2$ Quadratic Function

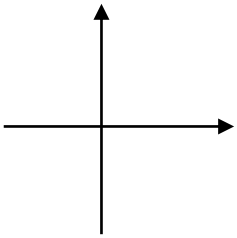


$y = x^6$

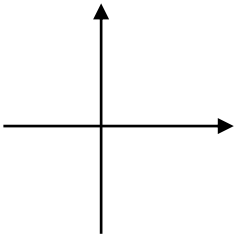


Power Funtions: Odd integer powers of x

$y = x^3$ Cubic Function

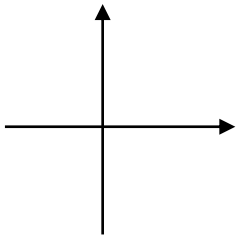


$y = x^5$

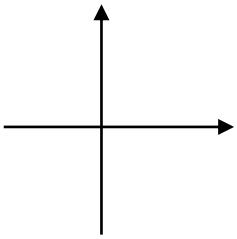


Power Funtions: Even Roots of x

$y = x^{1/2} = \sqrt{x}$ Square Root Function

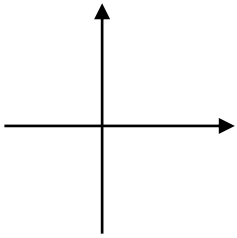


$y = x^{1/4} = \sqrt[4]{x}$

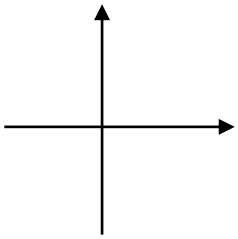


Power Funtions: Odd Roots of x

$y = x^{1/3} = \sqrt[3]{x}$ Cube Root Function

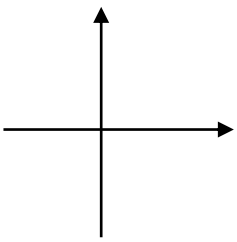


$y = x^{1/5} = \sqrt[5]{x}$

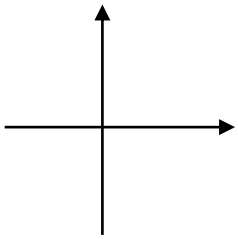


Power Funtions: Reciprocal Function and other Negative Powers of x

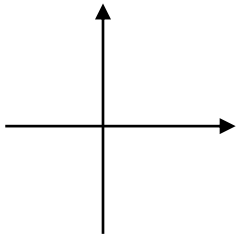
$y = x^{-1} = \frac{1}{x}$



$y = x^{-2} = \frac{1}{x^2}$



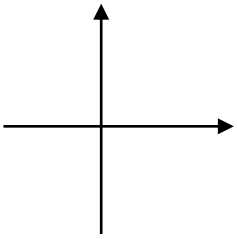
$y = x^{-3} = \frac{1}{x^3}$



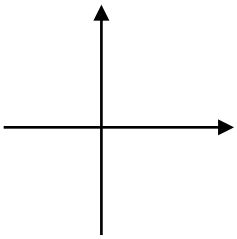
This worksheet reviews the graphs of basic families of functions that students learned about in beginning and intermediate algebra (and precalculus). For each function, sketch the graph , state the domain and range, and identify any asymptotes. Save this for reference to review the properties of these families of functions..

Exponential and Logarithmic Functions

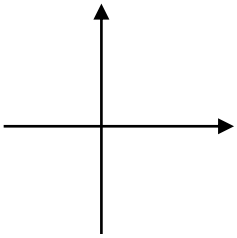
$y = e^x$
Exponential Growth



$y = e^{-x}$
Exponential Decay

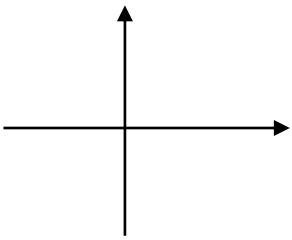


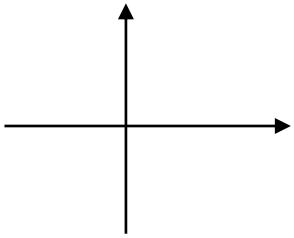
$y = \ln x$

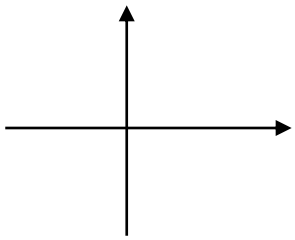


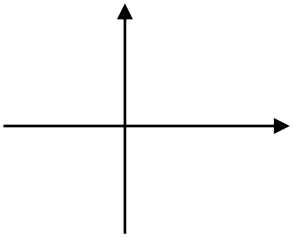
Some Sketches of Polynomial Functions:

$P(x) = a_n x^n + a_{n-1}x^{n-1} + \ldots + a_2 x^2 + a^1 x + a_0$



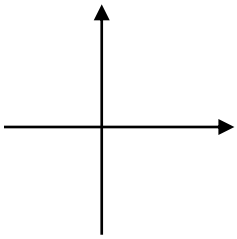


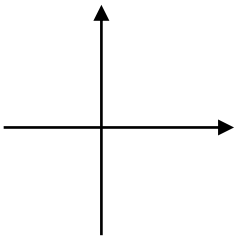


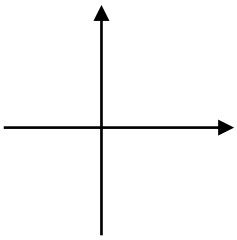


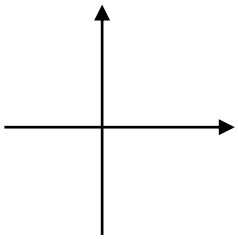
Some Sketches of Rational Functions

$R(x) = \dfrac{\text{Polynomial Function } P(x)}{\text{Polynomial Function } Q(x)}$









Relative Maximum (also called Local Maximum):
The point (a, f(a)) is a relative maximum of f if $f(a) \geq f(x)$for all x in some open interval about the value x = a.
(In the neighborhood of x = a, on both sides of x = a, no point is higher on the graph than the point (a, f(a))

Relative Minimum (also called Local Minimum)::
The point (a, f(a)) is a relative minimum of f if $f(a) \leq f(x)$ for all x in some open interval about the value x = a.
(In the neighborhood of x = a, on both sides of x = a, no point is lower on the graph than the point (a, f(a))

"Relative Extrema" means points that are either a relative maximum or relative minimum.