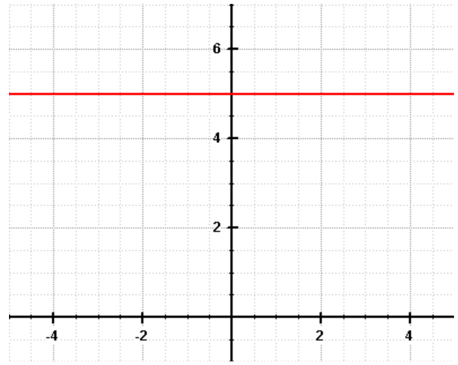
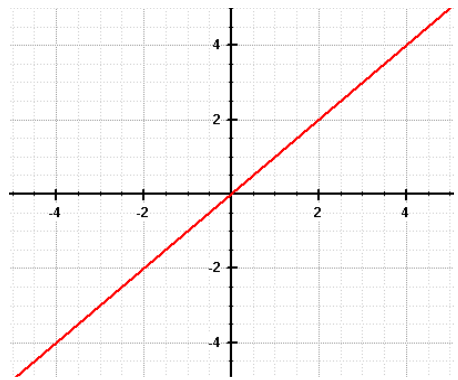
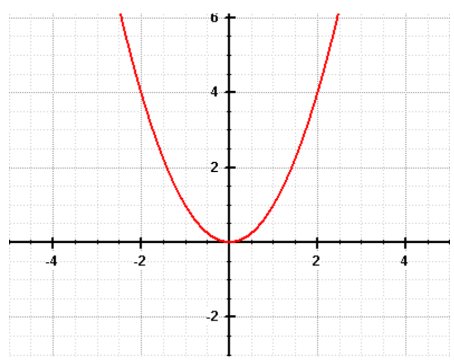
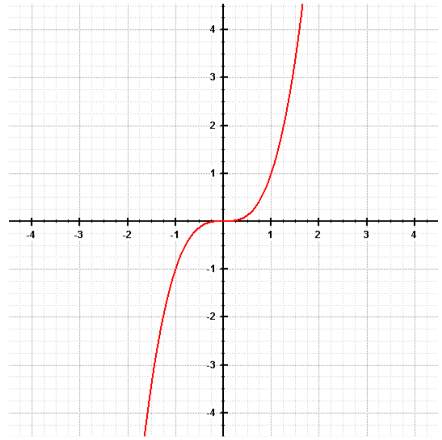
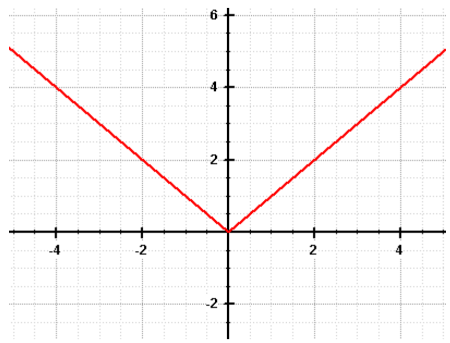
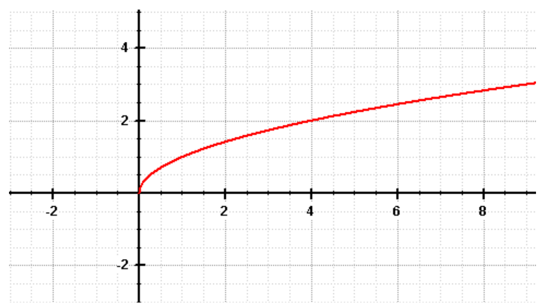
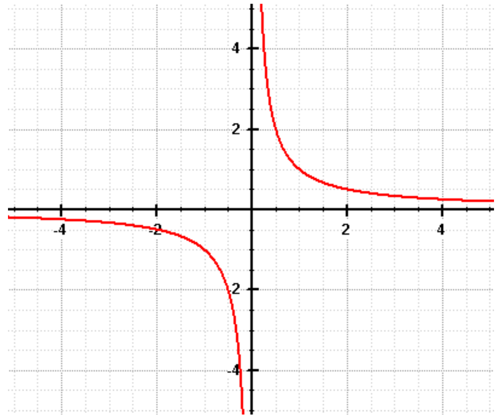
Some basic functions and their properties

Name of Function	Basic Equation	Domain	Range	Basic graph	Increasing Interval	Decreasing Interval	Constant Interval
Constant (line)	$y = 5$ $f(x) = 5$	$(-\infty, \infty)$	{5}		none	none	$(-\infty, \infty)$
Linear (line)	$y = x$ $f(x) = x$	$(-\infty, \infty)$	$(-\infty, \infty)$		$(-\infty, \infty)$	none	none
Quadratic (parabola)	$y = x^2$ $f(x) = x^2$	$(-\infty, \infty)$	$[0, \infty)$		$(0, \infty)$	$(-\infty, 0)$	none

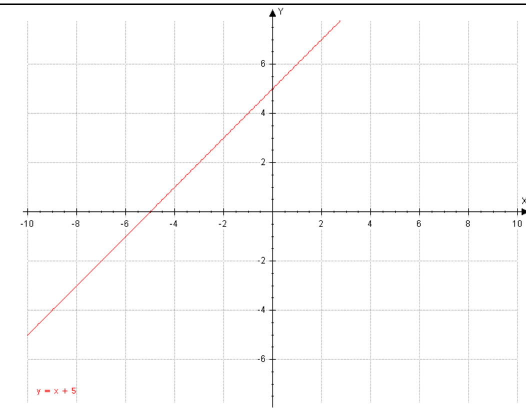
Name of Function	Basic Equation	Domain	Range	Basic graph	Increasing Interval	Decreasing Interval	Constant Interval
Cubic	$y = x^3$ $f(x) = x^3$	$(-\infty, \infty)$	$(-\infty, \infty)$		$(-\infty, \infty)$	none	none
Absolute Value	$y = \|x\|$ $f(x) = \|x\|$	$(-\infty, \infty)$	$[0, \infty)$		$(0, \infty)$	$(-\infty, 0)$	none
Radical	$y = \sqrt{x}$ $f(x) = \sqrt{x}$	$[0, \infty)$	$[0, \infty)$		$[0, \infty)$	none	none

Name of Function	Basic Equation	Domain	Range	Basic graph	Increasing Interval	Decreasing Interval	Constant Interval
Rational	$y = \frac{1}{x}$ $f(x) = \frac{1}{x}$	$(-\infty, 0) \cup (0, \infty)$	$(-\infty, 0) \cup (0, \infty)$		none	$(-\infty, 0) \cup (0, \infty)$	none

From these basic graphs we can graph more complicated ones.

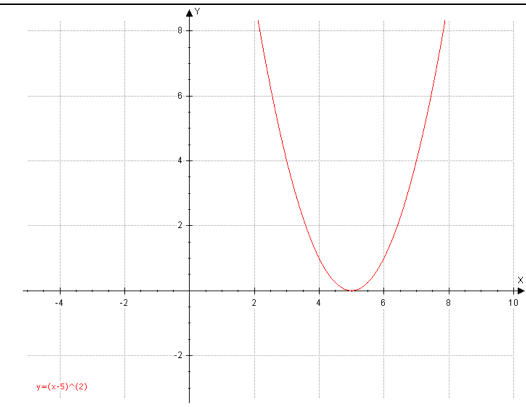
To Translate vertically add a constant to the basic function.

For example the line y = x + 5 is just the line y = x "moved up" 5 units. Instead of the y-intercept (0, 0), the y-intercept is now (0, 5).



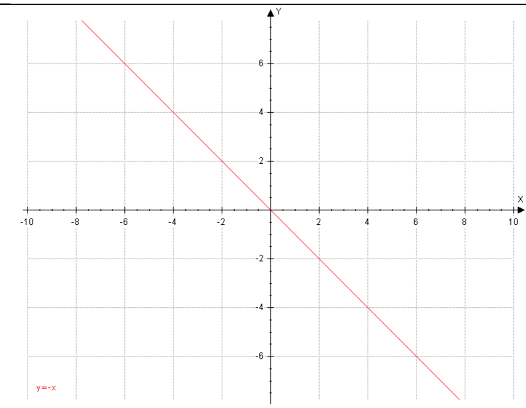
To Translate horizontally add a constant to the variable only.

For example the parabola $y = (x - 5)^2$ is the parabola $y = x^2$ “moved to the right” 5 units. So the vertex is (5, 0) instead of (0, 0).



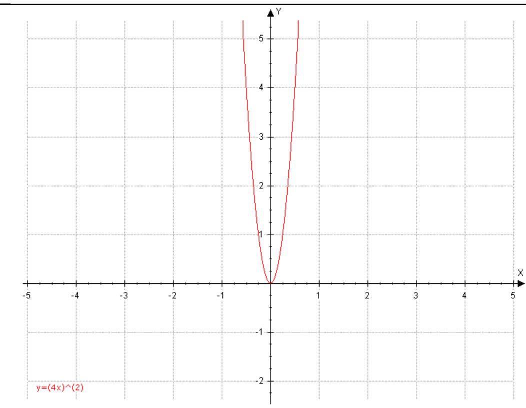
To Reflect (flip across x-axis) multiply whole function by -1

For example the line $y = -x$ is the line $y = x$ “flipped” across the x-axis.



To Stretch or Shrink multiply whole function by constant, $a > 1$ stretch “up & in”; $a < 1$ “down & out”.

For example the parabola $y = 4x^2$ is “a smaller bowl” than $y = x^2$.



Graphs were made using WZGrapher from www.walterzorn.com