

## Summary of Transformations

Original $f(x)$	Examples			
Vertical translation	$x^2$	$\sqrt{x}$	$ x $	$[[x]]$
(a units up) $f(x) + a$	$x^2 + a$	$\sqrt{x + a}$	$ x + a $	$[[x]] + a$
(a units down) $f(x) - a$	$x^2 - a$	$\sqrt{x - a}$	$ x - a $	$[[x]] - a$
Horizontal translation	$x^2$	$\sqrt{x}$	$ x $	$[[x]]$
(a units left) $f(x + a)$	$(x + a)^2$	$\sqrt{x + a}$	$ x + a $	$[[x + a]]$
(a units right) $f(x - a)$	$(x - a)^2$	$\sqrt{x - a}$	$ x - a $	$[[x - a]]$
$x$ - axis reflection	$x^2$	$\sqrt{x}$	$ x $	$[[x]]$
$- f(x)$	$-(x)^2$	$-\sqrt{x}$	$- x $	$-[[x]]$
$y$ - axis reflection	$x^2$	$\sqrt{x}$	$ x $	$[[x]]$
$f(-x)$	$(-x)^2$	$\sqrt{-x}$	$ -x $	$[[ - x ]]$
Vertical Stretch/compression	$x^2$	$\sqrt{x}$	$ x $	$[[x]]$
(Str by a factor of a) $a f(x)$	$a(x)^2$	$a\sqrt{x}$	$a x $	$a[[x]]$
(Comp by a factor of $\frac{1}{a}$ ) $\frac{1}{a} f(x)$	$\frac{1}{a}(x)^2$	$\frac{1}{a}\sqrt{x}$	$\frac{1}{a} x $	$\frac{1}{a}[[x]]$
Horizontal Stretch/compression	$x^2$	$\sqrt{x}$	$ x $	$[[x]]$
(Str by a factor of a) $f(\frac{1}{a}x)$	$(\frac{1}{a}x)^2$	$\sqrt{\frac{1}{a}x}$	$ \frac{1}{a}x $	$[[\frac{1}{a}x]]$
(Comp by a factor of $\frac{1}{a}$ ) $f(ax)$	$(ax)^2$	$\sqrt{ax}$	$ ax $	$[[ax]]$

Order of transformations:

First: Reflections/Stretches/Compressions - - - equal priority

Last: Translations