

Transformations	Effect On Graph
$f(x) + a$	Graph shifts 'a' boxes up (No effect on spread)
$f(x) - a$	Graph shifts 'a' boxes down. (No effect on spread)
$f(x + a)$	Graph shifts 'a' boxes to the left
$f(x - a)$	Graph shifts 'a' boxes to the right
$-f(x)$	Reflection in x-axis
$f(-x)$	Reflection in y-axis

$a f(x)$

stretch parallel to y-axis
with factor 'a'

- $a > 1$, stretch vertically
- $a < 1$, compress vertically

$f(ax)$

stretch parallel to x-axis
with factor $\left[\frac{1}{a}\right]$

- $a > 1$, compress horizontally
- $a < 1$, stretch horizontally