

Four simple rules (for translations)

Let E be any equation in the variables x (horizontal) and y (vertical). Let h , k , and a be real numbers with a positive.

- 1 $x \rightarrow x - h$ shifts the graph of E h units to the right.
- 2 $y \rightarrow y - k$ shifts the graph of E k units up.
- 3 $x \rightarrow x/a$ horizontally stretches the graph of E by a factor of a .
- 4 $y \rightarrow y/a$ vertically stretches the graph of E by a factor of a .
- 5 It doesn't matter if the equation is solved for y .
- 6 $-h$ units right is the same as h units left; $-k$ units up is the same as k units down.
- 7 A stretch of a factor of a is the same as squeeze by a factor of $1/a$.
- 8 Oops, that's seven rules (but four of them are simple).