



GRAPH TRANSFORMATION RULES

$f(x) + c$ up c units $x^2 + 2$
 $f(x) - c$ down c units $x^2 - 5$

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

$f(x+c)$ left c units $(x+2)^2$

$$y = \frac{1}{x+5}$$

$f(x-c)$ right c units $\sqrt[3]{x-8}$

$$y = \frac{1}{x} + 5$$

$-f(x)$ flip over x-axis $y = -\sqrt{x}$



$f(-x)$ flip over y-axis

$$y = \sqrt{-x}$$



$$y = -x^2$$



$$y = (-x)^2$$



$a f(x)$ $|a| > 1$ stretch vertically



$$y = 2x^2$$

$0 < |a| < 1$ shrinks vertically



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



$f(ax) =$ $|a| > 1$ shrink horizontally
 $0 < |a| < 1$ stretch horiz.

$$y = \sqrt{2x}$$



