

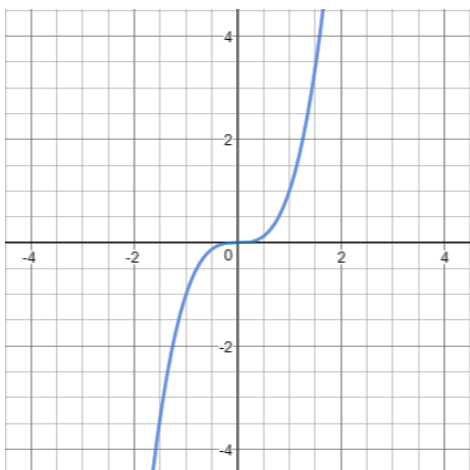
Transformation of Functions

For the graph $y = f(x)$, the following table depicts the effect of various transformations.

| Transformation | Effect | Details |
|----------------|--------------------------------------|---|
| $y = f(x) + C$ | horizontal shift by C units | +C shifts graph up -C shifts graph down |
| $y = f(x + C)$ | vertical shift by C units | $x + C$ shifts graph left $x - C$ shifts graph right |
| $y = Cf(x)$ | vertical stretch or compression | graph stretches when $ C > 1$ graph compresses when $ C < 1$ |
| $y = f(Cx)$ | horizontal stretch or compression | graph stretches when $ C < 1$ graph compresses when $ C > 1$ |
| $y = -f(x)$ | reflection about x-axis | if $f(-x) = -f(x)$, the function is odd and has origin symmetry |
| $y = f(-x)$ | reflection about y-axis | if $f(x) = f(-x)$, the function is even and has y-axis symmetry |

Example:

$$y =$$



$$y = + 2$$

