Shift

$y=f(x\pm c_1)\pm c_2$

(adding and subtracting)

Vertical

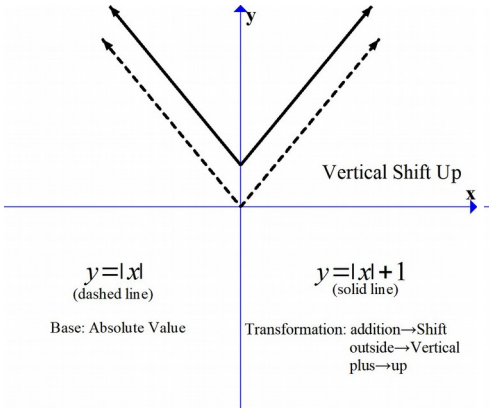
$y=f(x)\pm c$

(outside base operation)

Up

$y=f(x)+c$

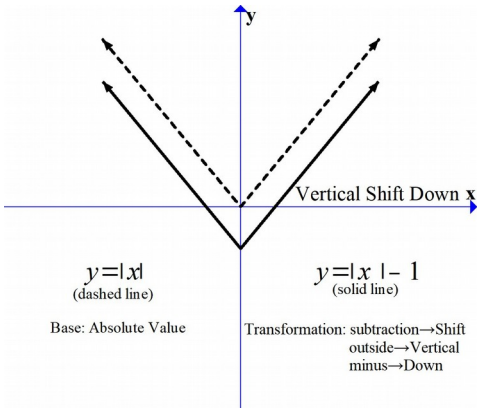
(plus)



Down

$y=f(x)-c$

(minus)



Horizontal

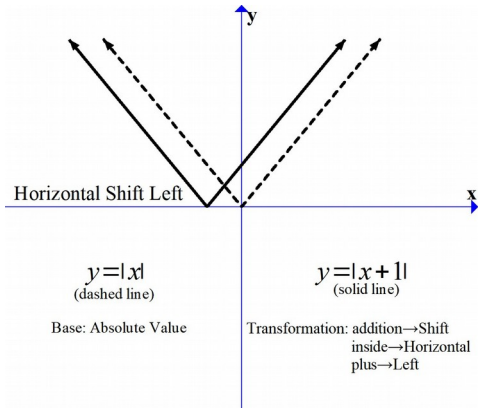
$y=f(x\pm c)$

(inside base operation)

Left

$y=f(x+c)$

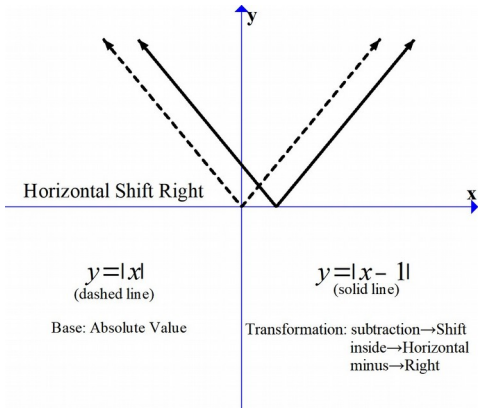
(plus)



Right

$y=f(x-c)$

(minus)



Reflection

$y=-f(-x)$

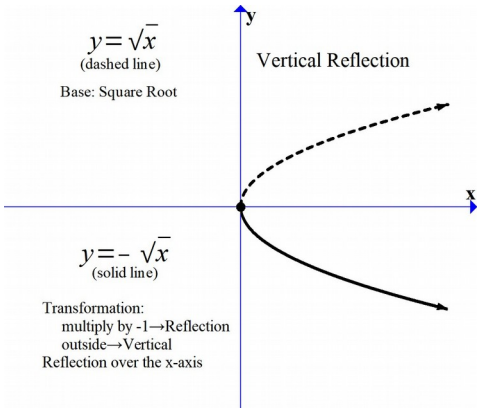
(multiplying negative one)

Vertical

(reflection over the x-axis)

$y=-f(x)$

(outside base operation)

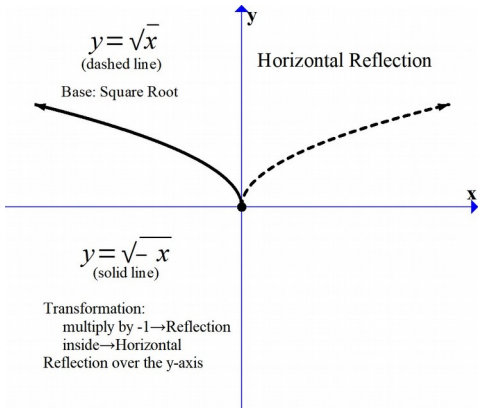


Horizontal

(reflection over the y-axis)

$y=f(-x)$

(inside base operation)



Stretch/ Compression

$y = c_1 f(c_2 x)$

(multiplying by a number)

Vertical

(adjust by multiplying y's by c)

$y = cf(x)$

(outside base operation)

vertical stretch

$y = cf(x), \quad c > 1$

vertical compression

$y = cf(x), \; 0 < c < 1$

Horizontal

(adjust by dividing x's by c)

$y = f(cx)$

(inside base operation)

horizontal compression

$y = f(cx), \quad c > 1$

horizontal stretch

$y = f(cx), \; 0 < c < 1$