

# Algebraic Transformations Guide

Inside (horizontal change)

$$t(x) = a \cdot f(b(x-h)) + k$$

X          y  
(parent  $x \div b$ , fixed) so:  
If  $b > 1$ , Then horizontal compression.  
If  $0 < b < 1$ , Then horizontal stretch.

Factor no coefficient of  $x = 1$

If  $-b$ , Then opposite  $x$ 's reflects (flips) over  $y$  axis.

If  $(-h)$ , Then horizontal translation (shift) right.  
If  $(+h)$ , Then horizontal translation (shift) left.

$$t(x) = a \cdot f(b(x-h)) + k$$

X          y  
(fixed, parent  $y \cdot a$ ) so:  
If  $a > 1$ , Then vertical stretch.  
If  $0 < a < 1$ , Then vertical compression.

If  $-a$ , Then opposite  $y$ 's reflects (flips) over  $x$  axis.

If  $+k$ , Then vertical translation (shift) up.  
If  $-k$ , Then vertical translation (shift) down.

$t(x) = a \cdot f(b(x-h)) + k$   
Outside (vertical change)

order of operations

- $a, b$  (Flip/stretch) Then  $(h, k)$  shift
- or
- $(h, k)$  shift creating "new axis" Then using  $a, b$  (Flip/stretch)