


Transformations of Functions (does not include trigonometric functions)


General Equation in function notation:

$$g(x) = a f(b(x-h)) + k$$

Transformations for each letter

If a is negative: reflect vertically
 reflect over x -axis 

a = vertical dilation (stretch/shrink)
 stretch = $a > 1$
 shrink = $0 < a < 1$ (fraction)

If b is negative: reflect horizontally
 reflect over y -axis 

b = horizontal dilation
 stretch $0 < a < 1$ (fraction)
 shrink $a > 1$ (do opp)

h = translate (shift) right or left,
 horizontal, do opp

k = translate up or down,
 vertical

Transformations of Functions (does not include trigonometric functions)

General Equation in function notation:

Transformations for each letter

If a is negative:

$a =$

If b is negative:

$b =$

$h =$

$k =$

Vertical transformations are letters a, k

Horizontal transformations are letters b, h

a = Vertical reflections and dilations multiply to y-values.

b = Horizontal reflections and dilations multiply reciprocal = divide to x-values, but using the opp oper.

k = Vertical translations add or subtract to the y-values.

h = Horizontal translations add or subtract to the x-values, but using the opp oper.

Transformations must be done in this order.

EX. $g(x) = -3(-2(x - 4))^2 + 1$

Parent $= x^2$

x	f(x)
-2	4
-1	1
0	0
1	1
2	4

Reflections (crossed out)

x	f(x)

Stretches/Compressions $\frac{1}{b}x$, $-3f(x)$

$-\frac{1}{2}x$	$-3f(x)$
1	-12
$\frac{1}{2}$	-3
0	0
$-\frac{1}{2}$	-3
-1	-12

Translations (Shifts) $x+h$, $f(x)+k$

$x+4$	$f(x)+1$
5	-11
$4\frac{1}{2}$	-2
4	1
$3\frac{1}{2}$	-2
3	-11

Vertical transformations are letters _____, _____

Horizontal transformations are letters _____, _____

Vertical reflections and dilations _____ to y-values.

Horizontal reflections and dilations _____ to x-values, but using the _____.

Vertical translations _____ or _____ to the y-values.

Horizontal translations _____ or _____ to the x-values, but using the _____.

Transformations must be done in this order.

EX. $g(x) = -3(-2(x - 4))^2 + 1$

Parent

x	f(x)

Reflections

x	f(x)

Stretches/Compressions

x	f(x)

Translations (Shifts)

x	f(x)