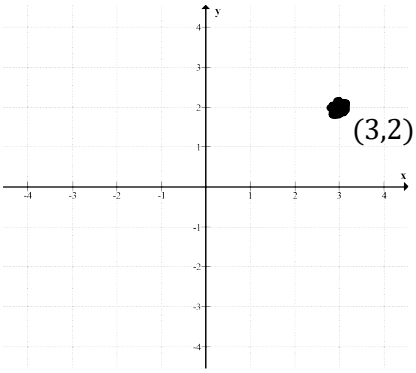
C12 - 1.1 - VHT Point Notes

Find new point.

$y = f(x)$



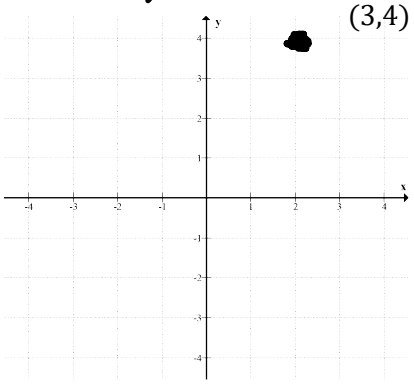
Point

$(3,2)$ *is on* $f(x)$

Function Notation

$y = f(x)$

$y - 2 = f(x) + 2$



Operation

$(3,2)$

$VT = +2$ $(3,4)$ Add 2 to y-value

UP TWO

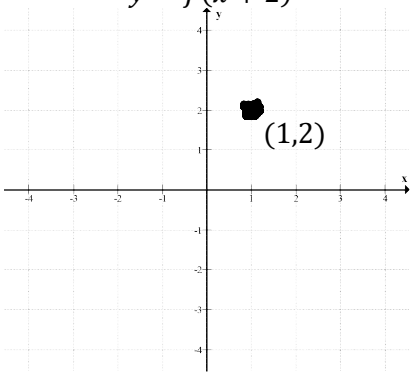
A Vertical Translation up 2

$y + 2$

Mapping Notation

$(x, y + 2)$

$y = f(x + 2)$



$(3,2)$

$HT = -2$ $(1,2)$ Subtract 2 from x-value

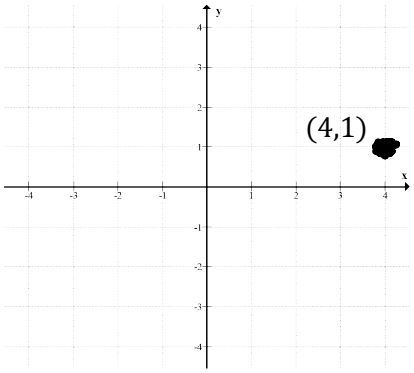
LEFT 2

A Horizontal Translation left 2

$x - 2$

$(x - 2, y)$

$y + 1 = f(x - 1)$



$(3,2)$

$HT = +1$ $(4,2)$ Add 1 to x-value

$VT = -1$ $(4,1)$ Subtract 1 from y-value

RIGHT 1
DOWN 1

A Horizontal Translation right 1
A Vertical Translation down 1

$x + 1$ $y - 1$

$(x + 1, y - 1)$

Do exactly what you see outside of the brackets on the right-hand side to the **y-value**
Do the **Opposite** of what you see inside the brackets to the **x-value**. Attached to the variable.
Do the **Opposite** of what you see on the left hand side to the **y-value**. Attached to the variable.

C12 - 1.1 - VHT Function Notation f(x) Notes

$y = f(x)$

$f(x) = x^2$ *Given*

$f(3) = ?$ $(3, y)$ *What is y when x is 3.*

$f(x) = x^2$
$f(x) = (x)^2$
$f(3) = (3)^2$

Put 3 in for x.

$f(3) = 9$ (3,9)

Put whatever is inside the brackets in for x. Substitute with Brackets

$y = x^2$
$y = (3)^2$
$y = 9$

x	y
3	9

$f(x) = x^2$

$f(x + 2) = ?$

$f(x) = x^2$

$f(x + 2) = (x + 2)^2$

Let's call it $g(x)$

Put $(x + 2)$ in for x.

Function Notation

$g(x) = ?$

$g(x) = f(x + 2)$

$g(x) = (x + 2)^2$

$HT = -2$

$f(x) + 1 = ?$

$f(x) = x^2$

$f(x) + 1 = x^2 + 1$

Let's call it $m(x)$

$f(x) + 1$

$m(x) = ?$

$m(x) = f(x) + 1$

$m(x) = x^2 + 1$

$VT = +1$

$f(x)$ does not mean $f \times x$
$f(x)$ is one thing
We dont divide by any part of $f(x)$ or $f(\#)$
Cant Distribute into/Factor out of a function $f(x)$

y is a variable
f is a function

$y = f(x)$ $y = m(x)$ $y = g(x)$

$g(x) \neq f(x) \neq m(x)$

Unless they do

C12 - 1.1 - VHT Graph y= Notes

Vertical Translation Up One

$$VT = +1$$

$$y = x^2$$
$$y - 1 = x^2 \qquad y \to y - 1$$
$$y = x^2 + 1$$

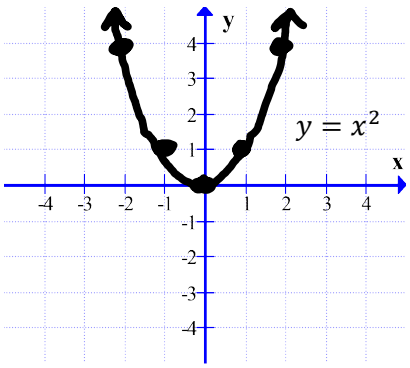
$Put\ y - 1\ in\ for\ y$

Substitute the Opposite Operation for the Variable

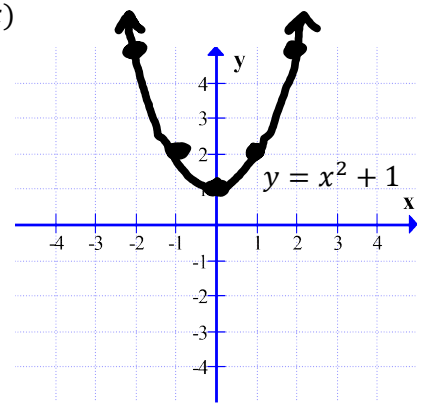
$g(x) = x^2 + 1$

Let's call it $g(x)$

$y = f(x)$



$g(x) = x^2 + 1$



x	y
-2	4
-1	1
0	0
1	1
2	4

x	y
-2	5
-1	2
0	1
1	2
2	5

Add 1 to the y-value

$Up\ 1$

Horizontal Translation Left One

$$HT = -1$$

$$y = \sqrt{x}$$
$$y = \sqrt{x + 1} \qquad x \to x + 1$$

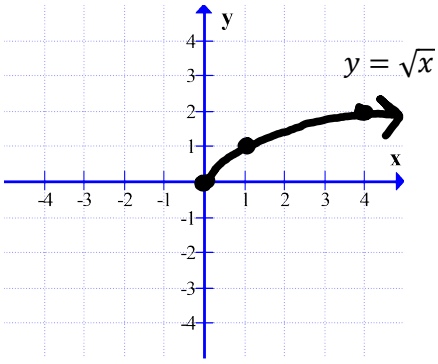
$Put\ x + 1\ in\ for\ x$

Substitute the Opposite Operation for the Variable

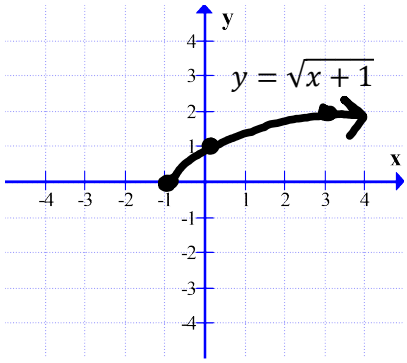
$m(x) = \sqrt{x + 1}$

Let's call it $m(x)$

$y = f(x)$



$m(x) = f(x + 1)$



x	y
-1	und
0	0
1	1
4	2

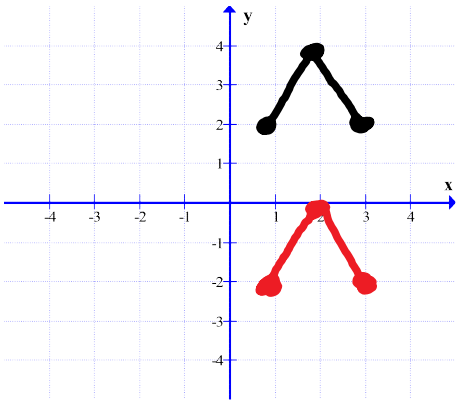
x	y
-2	und
-1	0
0	1
3	2

Subtract 1 from the x-value

$Left\ 1$

C12 - 1.1 - VHT Graphs f(x) Notes

Find the transformed equation of $f(x)$ in all forms.



$y = f(x)$

$y = f(x) + k$

$y = f(x) + 4$

$y - k = f(x)$

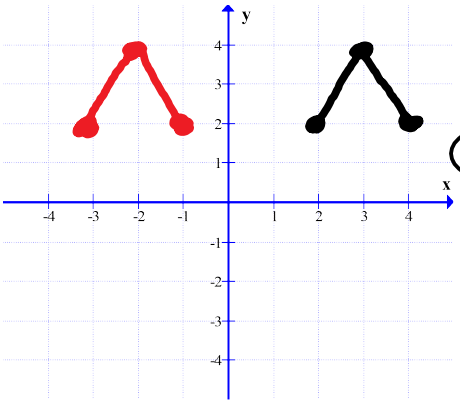
$y - 4 = f(x)$

$y = f(x)$
$y - 4 = f(x)$

$y = f(x) + 4$

$VT = 4 \quad y \to y - 4$

$y = f(x)$



$y = f(x - h)$

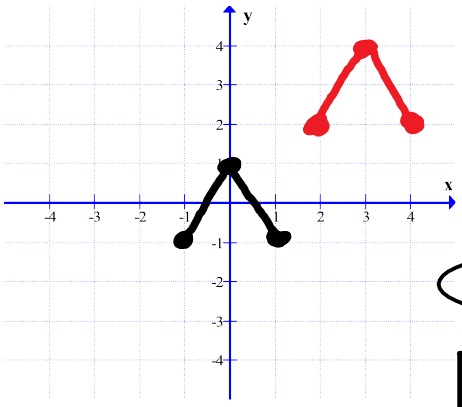
$y = f(x - 5)$

$y = f(x)$

$y = f(x - 5)$

$HT = +5 \quad x \to x - 5$

$y = f(x)$



$y = f(x - h) + k$

$y = f(x + 3) - 3$

$y = f(x)$
$y = f(x + 3)$
$y + 3 = f(x + 3)$

$y = f(x + 3) - 3$

$HT = -3 \quad x \to x + 3$
$VT = -3 \quad y \to y + 3$