

10/13 M

x 's always lie
They do the opposite

2^x original
 2^{x-2} Right shift
 $2^x - 2$ Down
 2^{x+2} Left
 $2^x + 2$ Upward

2^x original
 $\frac{2^x}{3}$ Vertical shrink
 $2^x \cdot 3$ Vertical stretch

} Put into calculator

Transformation from $f(x) = x^2$

Table Transformations

- Vertex Form {
- a) $x^2 + 3$ upward shift by 3
 - b) $x^2 - 2$ down shift by 2
 - c) $(x-1)^2$ Right shift by 1
 - d) $(x+4)^2$ Left shift 4
 - e) $(x+2)^2 - 1$ Left 2, down 1
 - f) $(x-6)^2 + 3$ Right 6, up 3

x	$f(x)$	x	$a(x)$	x	$b(x)$
-2	4	-2	0	-2	6
-1	1	-1	1	-1	3
0	0	0	4	0	2
1	1	1	9	1	3
2	4	2	16	2	6

$f(x) = x^2$

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

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

Negative inside function reflex over y
 Negative outside function reflex over x

Change in x

Change in y

$2x^2 = a(x)$

$\frac{1}{2}x^2 = \frac{x^2}{2} = b(x)$

$x^2 = f(x)$

x	$a(x)$
-2	8
-1	2
0	0
1	2
2	8

$2(f(x))$

x	$b(x)$
-2	2
-1	$\frac{1}{2}$
0	0
1	$\frac{1}{2}$
2	2

$\frac{1}{2}(f(x))$ or $\frac{f(x)}{2}$

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

$g(x) = -f(x) \rightarrow$ tells you to make the y -values negative

$h(x) = f(-x) \rightarrow$ tells you to make the x -values negative