

**LEARNING TARGET:**



"I can sketch the "mother graph" for a quadratic and an exponential function with *and without* a table of values.

I can apply vertical translations to the "mother graph".  
I understand the "step pattern" for a quadratic."

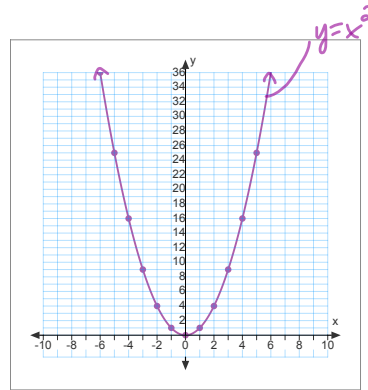
Vertical Translations of Quadratics and Exponentials

Ex.1 Let's begin by graphing the "parent functions" or "mother graphs" for quadratics and exponentials.

a) The Quadratic Function:  $y = x^2$

x	$y = x^2$
-5	25
-4	16
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9
4	16
5	25

$y = (-1)^2$   
 $= (-1)(-1)$   
 $= 1$



Vertex (0, 0)

From the vertex, the step pattern is:

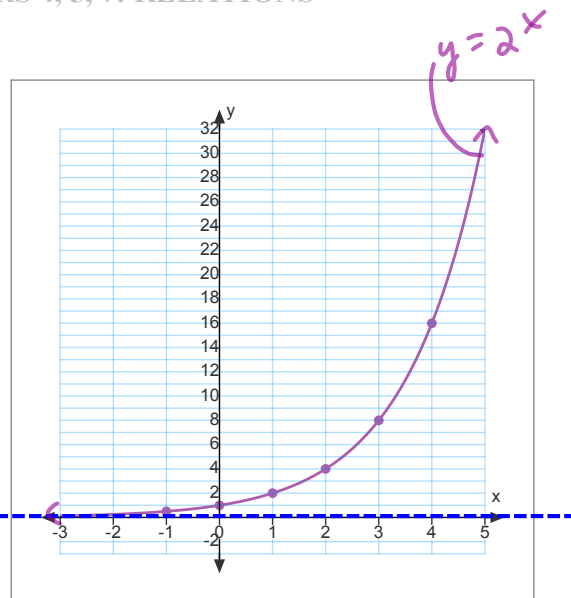
OVER UP

$\begin{matrix} 1 & 1 \\ 2 & 4 \\ 3 & 9 \end{matrix}$

b) The Exponential Function:  $y = 2^x$

x	$y = 2^x$
-2	0.25
-1	0.5
0	1
1	2
2	4
3	8
4	16
5	32

$y = 2^{(3)}$   
 $= (2)(2)(2)$



Horizontal Asymptote:  $y = 0$

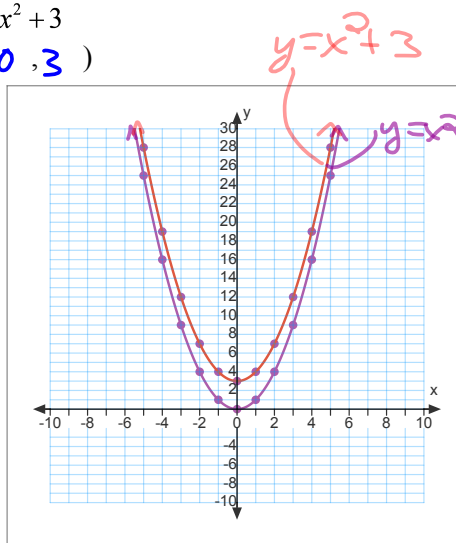
You must **ALWAYS** include the Horizontal Asymptote when you graph an exponential!

Cycle 2 Day 1 MBF 3C1 CHAPTERS 4, 5, 7: RELATIONS

We will now use "step patterns" instead of a table of values.

Ex.2 In general,  $y = x^2 + k$  Vertex (0, k)

- a)  $y = x^2$  and b)  $y = x^2 + 3$   
 Vertex (0, 0) Vertex (0, 3)



Cycle 2 Day 1 MBF 3C1 CHAPTERS 4, 5, 7: RELATIONS

We will now use "step patterns" instead of a table of values.

Ex.3 In general,  $y = 2^x + k$

- a)  $y = 2^x$  and b)  $y = 2^x + 5$   
 H.Asymptote:  $y = 0$  H.Asymptote:  $y = 5$

