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

Date: NOV.16/17

LEARNING TARGET:

"I can graph a quadratic relation (parabola) with ***and without*** a table of values that is reflected, stretched or compressed (when compared to the mother graph)."

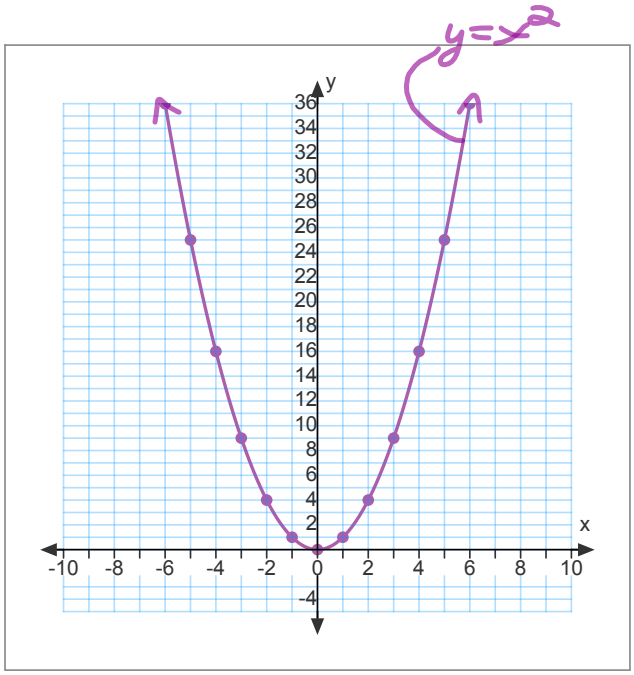
Graphing Quadratics with Stretches and Compressions (from Vertex Form): $y=ax^2$

Recall: The mother graph for a parabola is $\mathbf{y = x^2}$, and is in vertex form, with vertex (0 , 0).

$y = x^2$ Construct $\mathbf{y = x^2}$ below. Assume that 1 block = 1 units^2

$y=(\ )^2$

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



Memorize

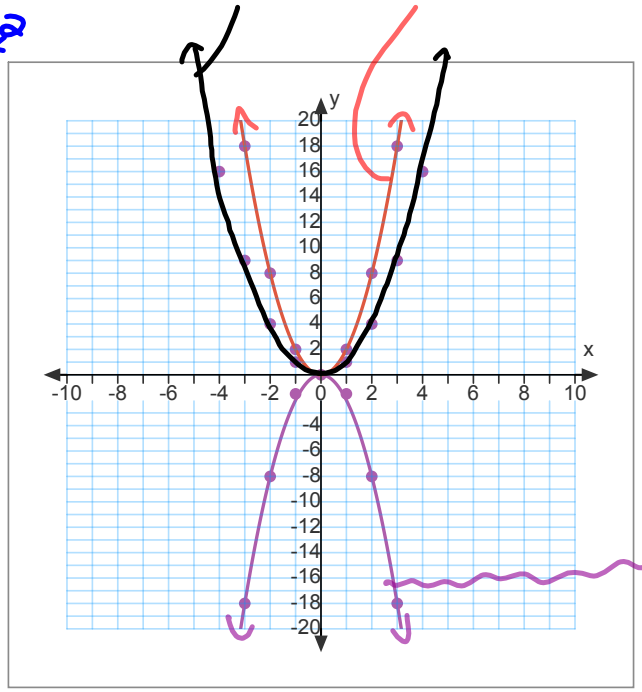
$1^2 = 1$
$2^2 = 4$
$3^2 = 9$
$4^2 = 16$
$5^2 = 25$
$6^2 = 36$

over	up
1	1
2	4
3	9
4	16
5	25
6	36

Every parabola can be made using "transformations" of this graph.

Ex.1 On the same grid, graph $y = x^2$, and $y = 2x^2$, and $y = -2x^2$.

M	G	$y=2x^2$	$y=-2x^2$
1	1	2	-2
2	4	8	-8
3	9	18	-18
4	16	32	-32

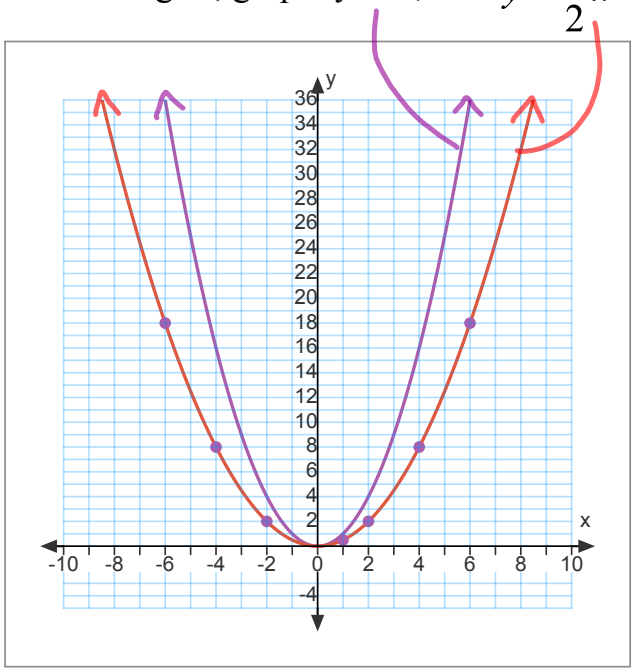


$y = x^2$

$y = 2x^2$

$y = -2x^2$

Ex.2 On the same grid, graph $y = x^2$, and $y = \frac{1}{2}x^2$.



$y = \frac{1}{2}x^2$ $y = x^2$

MG $y = \frac{1}{a}(\ )^2$

1 1 → $\frac{1}{2}$ 0.5

2 4 → 2

3 9 → 4.5

4 16 → 8

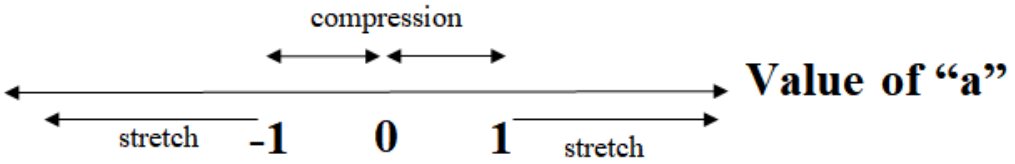
5 ~~25~~

6 36 → 18

The "**a**" value will always determine the **step pattern**, **AND** if the parabola opens up or down.
Remember, the step pattern of the mother graph is always: over 1, up 1; 2; 3; 9

Note: If a graph is **WIDE**, it is a vertical **COMPRESSION**.
If the graph is **narrow**, it is a vertical **stretch**.
The value of "**a**" will decide whether or not it is a compression or a stretch.

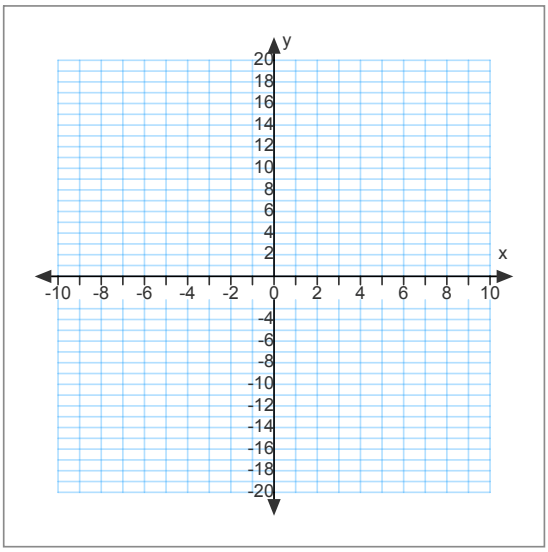
Here is a visual aid:

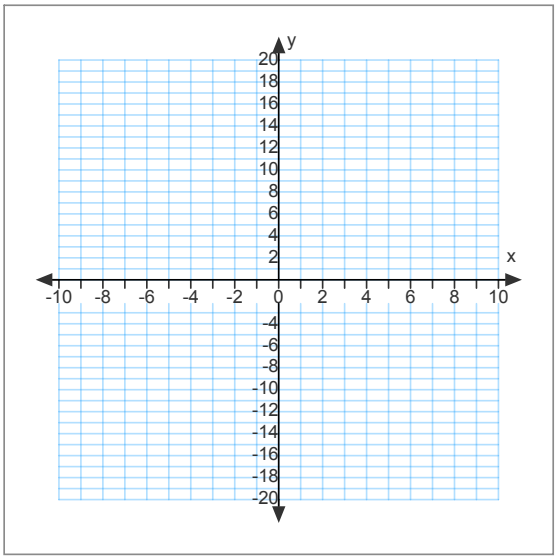


Today's Entertainment: PRACTICE

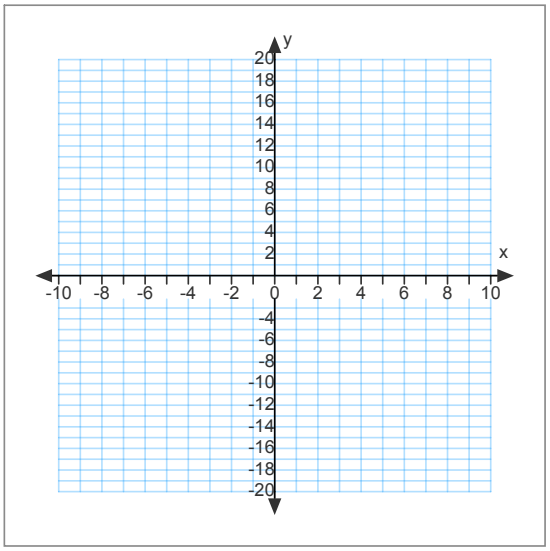
1. Graph two parabolas per grid:

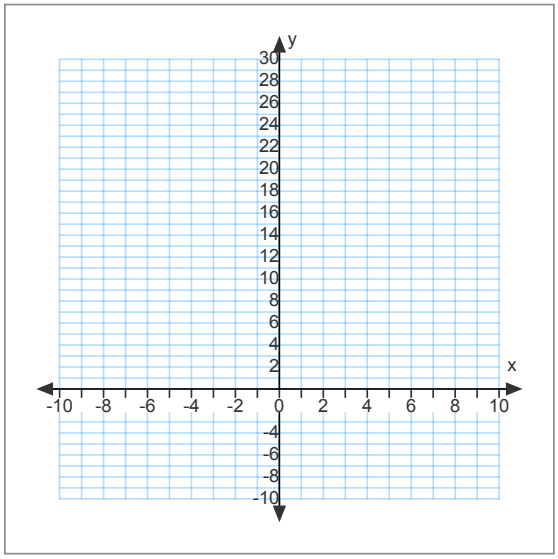
a) $y = -x^2$ **b)** $y = 4x^2$ **c)** $y = -\frac{1}{2}x^2$ **d)** $y = \frac{1}{4}x^2$





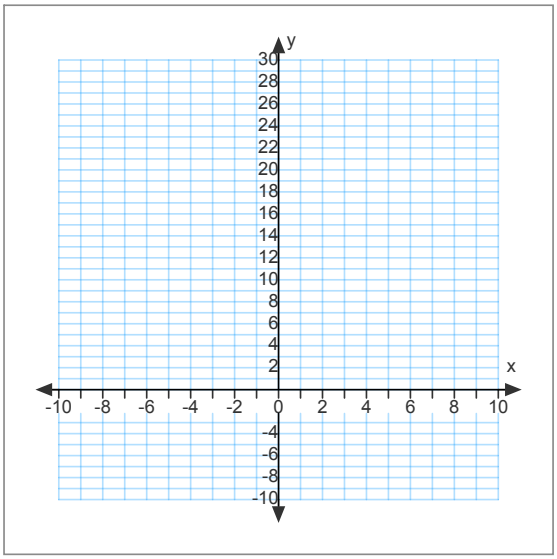
e) $y = \frac{1}{3}x^2$ **f)** $y = -2x^2$ **g)** $y = 3x^2$ **h)** $y = \frac{1}{5}x^2$





i) $y = 3(x+5)^2 - 9$

vertex (,)



j) $y = 2(x-3)^2 + 1$

vertex (,)

k) $y = -2(x+7)^2 + 10$

vertex (,)

l) $y = \frac{1}{3}(x-4)^2 + 6$

vertex (,)