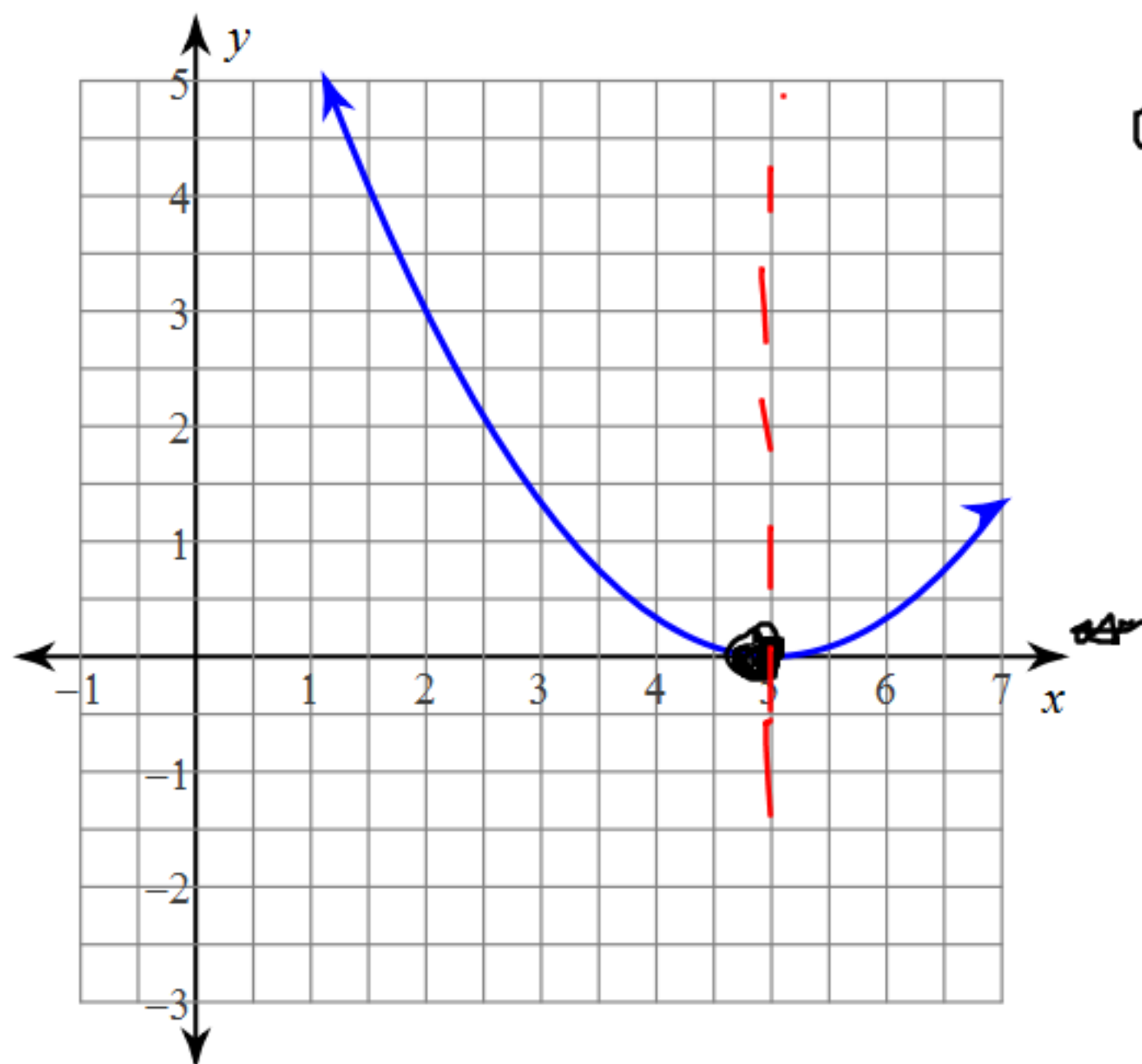
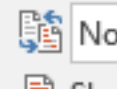
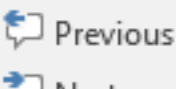


Use the information provided state the axis of symmetry, vertex, max/min, zeroes, and y intercept, and whether it opens up or down.

5)



$\text{A.O.S.} = x = 5$
 vertex = $(5, 0)$
 min
 zeroes = $\sqrt{5}$
~~y-int~~
~~opens~~
 up



Stretching and Reflecting Quadratic Relations

The most basic quadratic relation is $y = x^2$ (aka the origin)

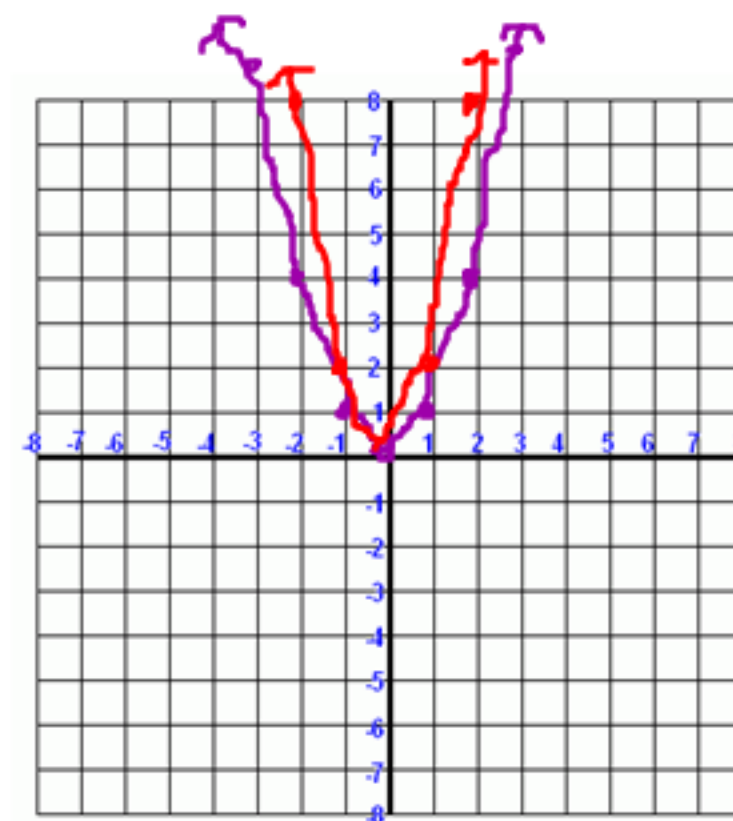
To understand the concept of Stretch and Reflecting, we will be comparing $y = x^2$ to $y = ax^2$

We call "a" a transformation

Let's compare the Table of Values for $y = x^2$ and $y = 2x^2$.



over 1, up $1 \times 2 = 2$
over 1, up $3 \times 2 = 6$



The a value transforms the basic quadratic by _____ the y-values.

We call this a _____ by a factor of _____

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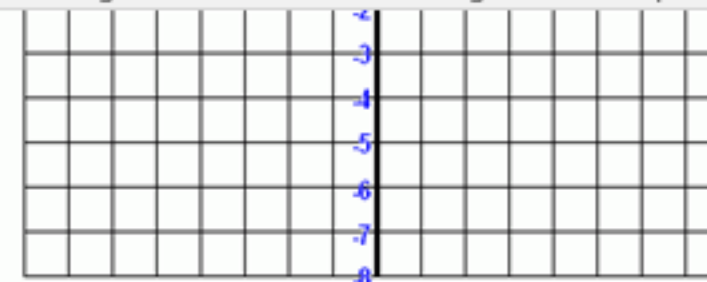
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0	0
-1	-1
-2	-2



The a value transforms the basic quadratic by changing the y-values.

We call this a vertical shrink by a factor of 2.

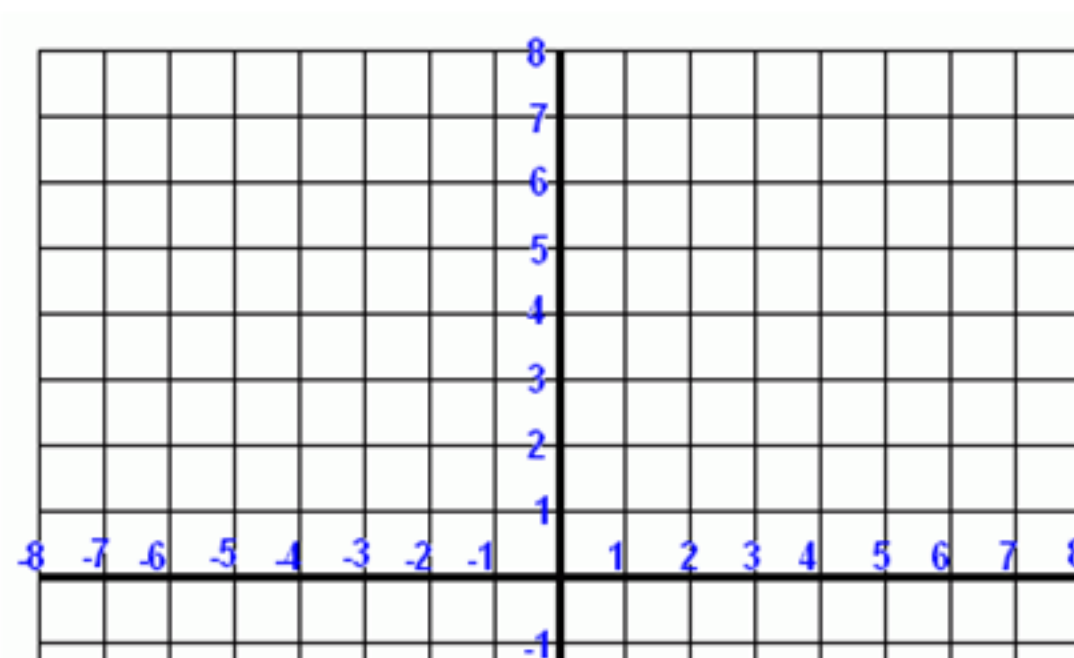
Translations of Quadratic Functions

Another word for translations is Shift.

Make a table of values and make a sketch of the graph for the following equations:

$$y = x^2 - 2$$

$$y = x^2 + 3$$



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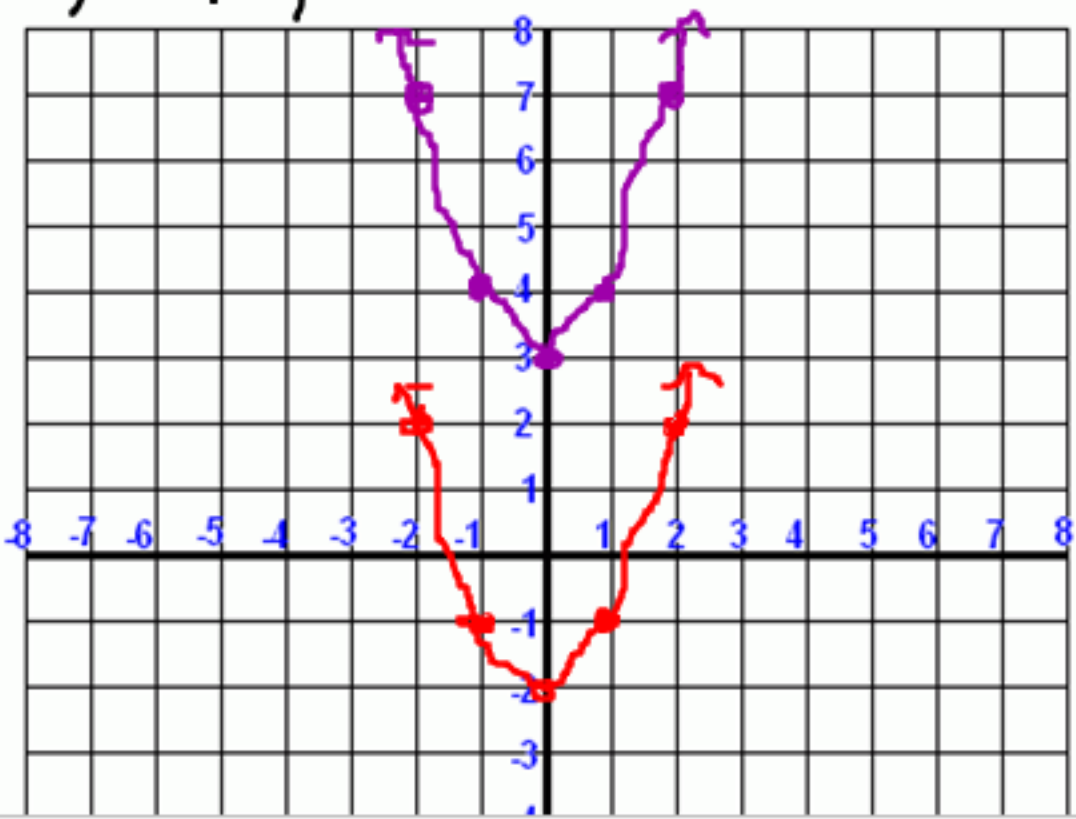
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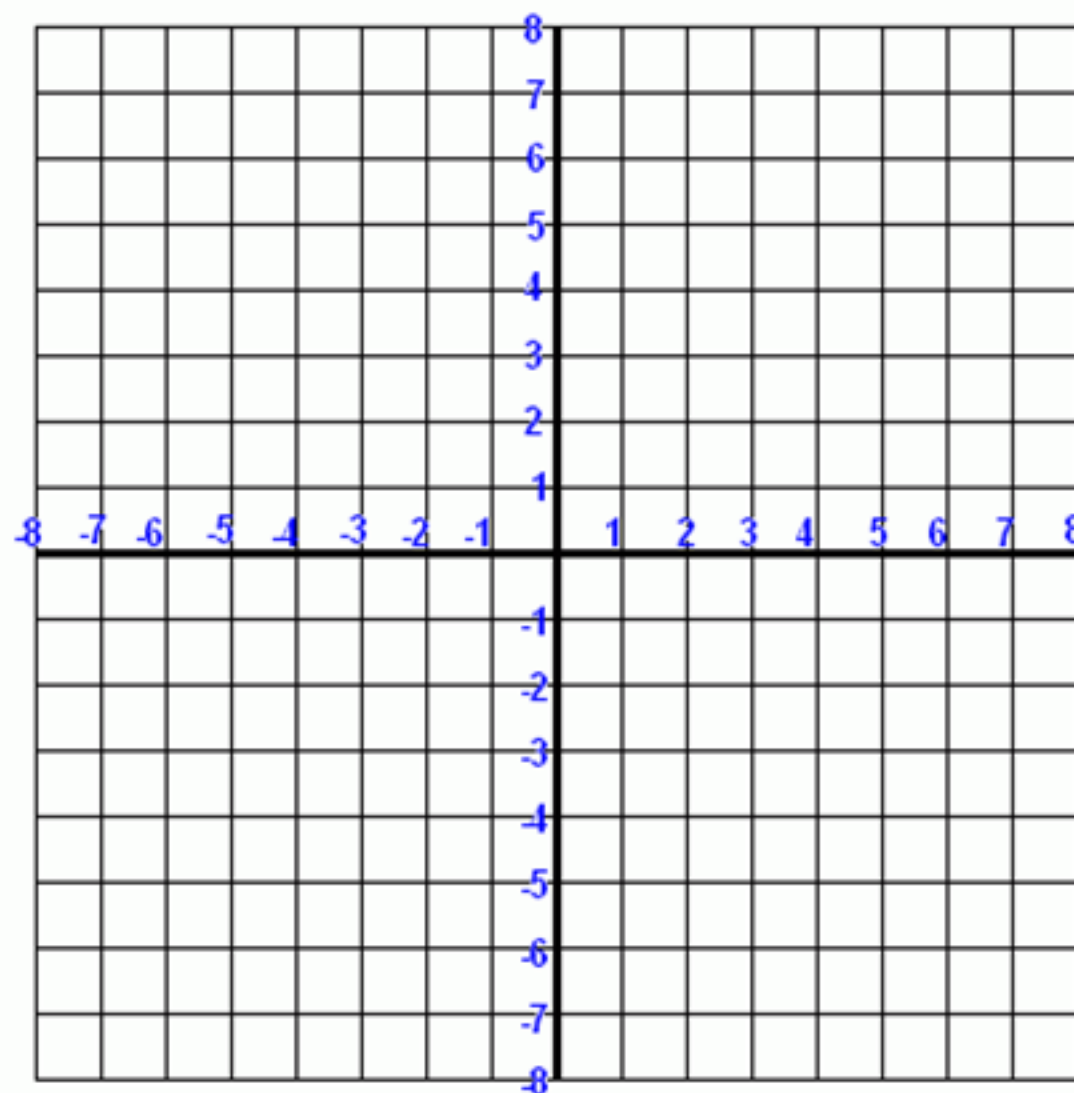
Another word for **translations** is _____.

Make a table of values and make a sketch of the graph for the following equations:

x	$x^2 - 2$	(x, y)
-2	$(-2)^2 - 2 = 2$	$(-2, 2)$
-1	$(-1)^2 - 2 = -1$	$(-1, -1)$
0	$(0)^2 - 2 = -2$	$(0, -2)$
1	$(1)^2 - 2 = -1$	$(1, -1)$
2	$(2)^2 - 2 = 2$	

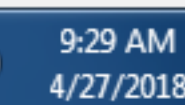
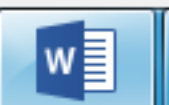
$y = x^2 + 3$
 start step pattern
 at +3 on y axis





The first parabola has a vertical shift shift of down 2.

The second parabola has a vertical shift shift of up 3.



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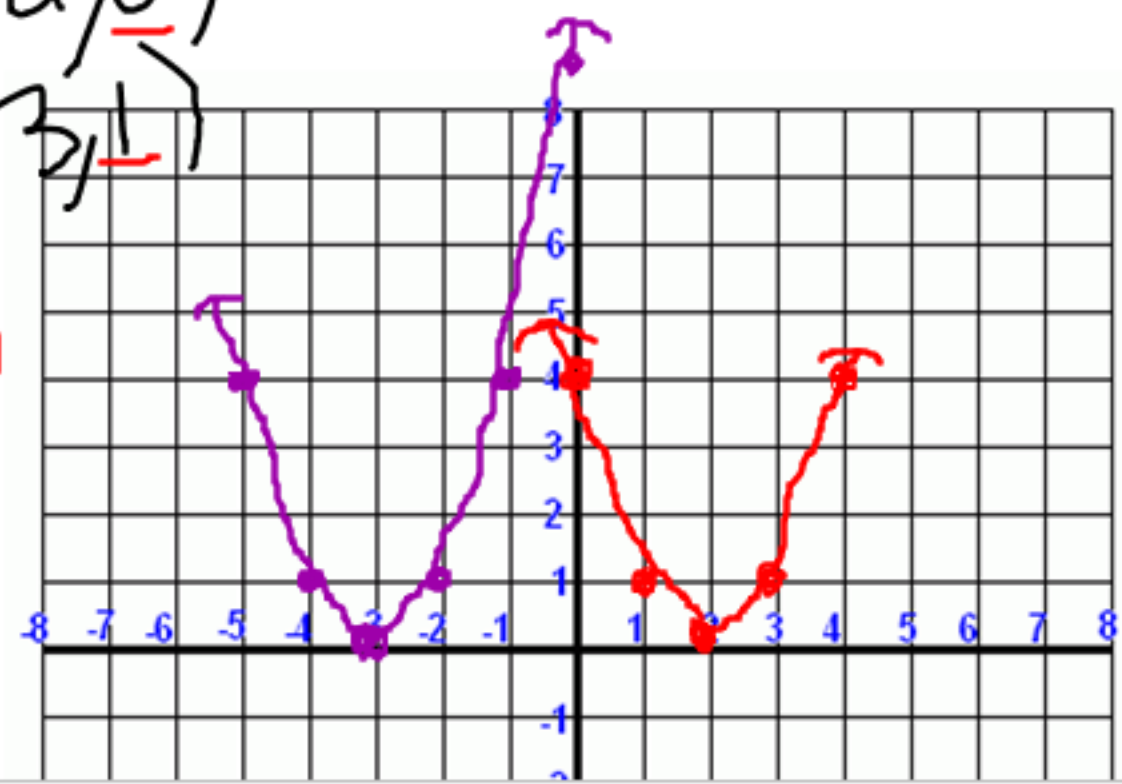
Make a table of values and make a sketch of the graph for the following equations:

x	$(x-2)^2$	(x,y)
-2	$(-2-2)^2 = 16$	$(-2, 16)$
-1	$(-1-2)^2 = 9$	$(-1, 9)$
0	$(0-2)^2 = 4$	$(0, 4)$
1	$(1-2)^2 = 1$	$(1, 1)$
2	$(2-2)^2 = 0$	$(2, 0)$
3	$(3-2)^2 = 1$	$(3, 1)$

$2^2 = 4$

$(4, 4)$

$y = (x+3)^2$
start at -3 on the x axis



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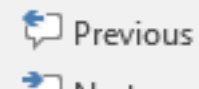
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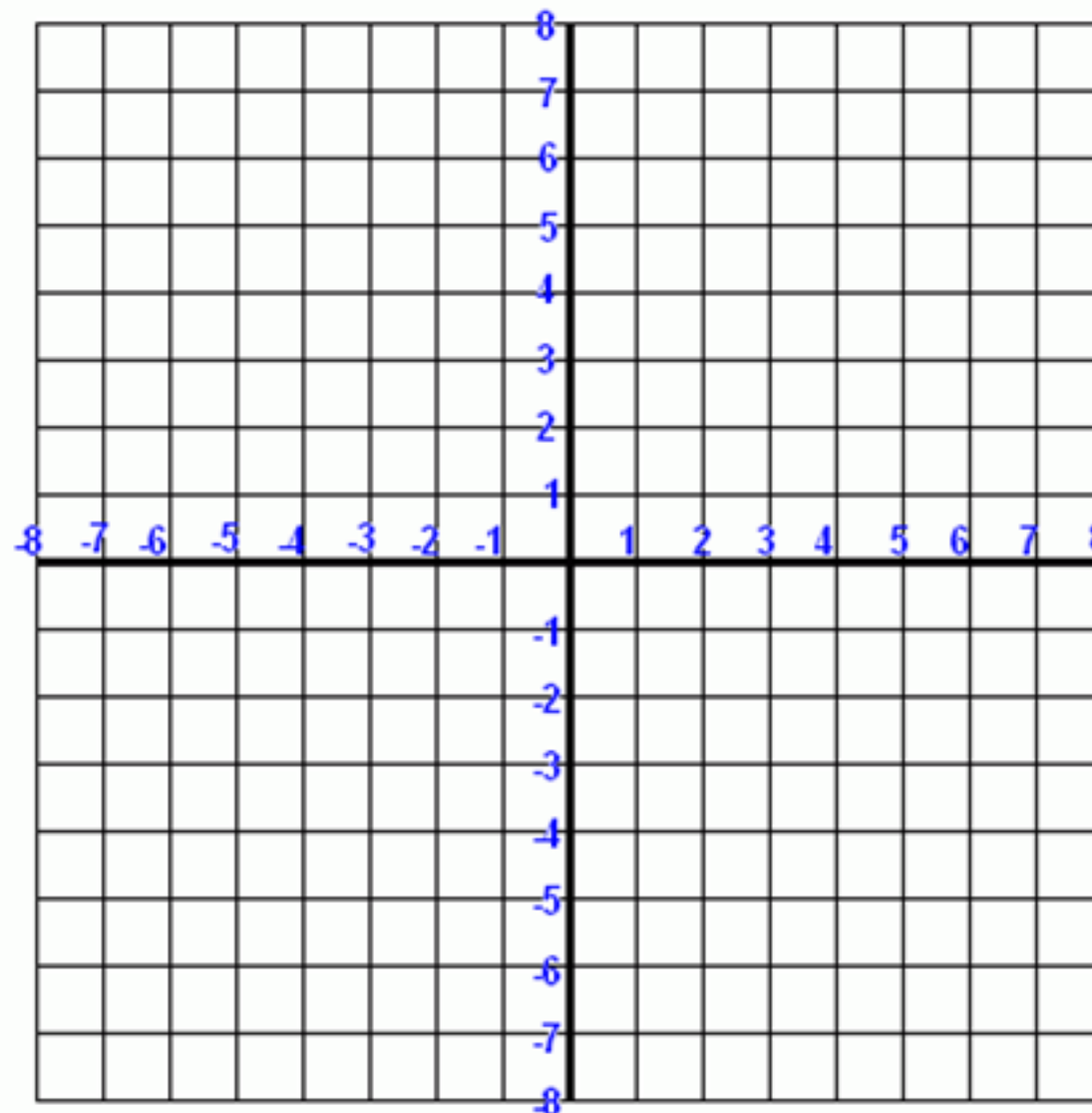
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The first parabola has a horizontal shift right 2

The second parabola has a horizontal shift left 3

