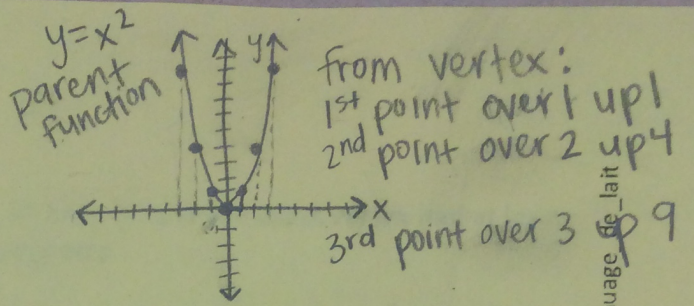


Mrs. Clark's Notes

SECONDARY MATH II // MODULE 2
STRUCTURES OF EXPRESSIONS

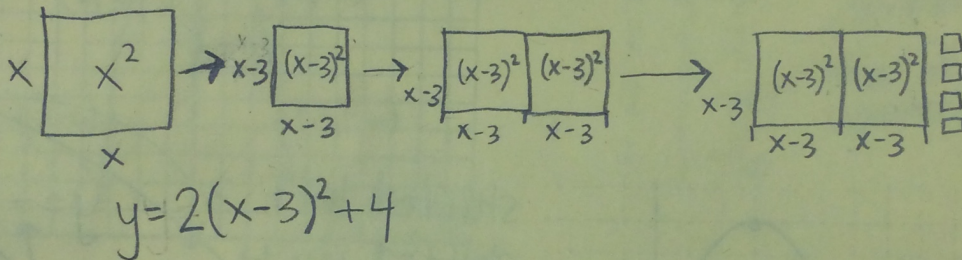


2.2 Transformers: More Than Meets the y's

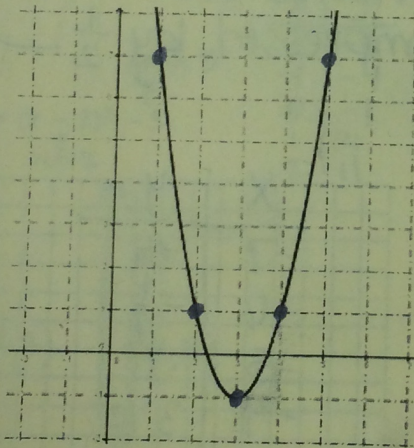
A Solidify Understanding Task

Write the equation for each problem below. Use a second representation to check your equation.

- The area of a square with side length x , where the side length is decreased by 3, the area is multiplied by 2 and then 4 square units are added to the area.



2.



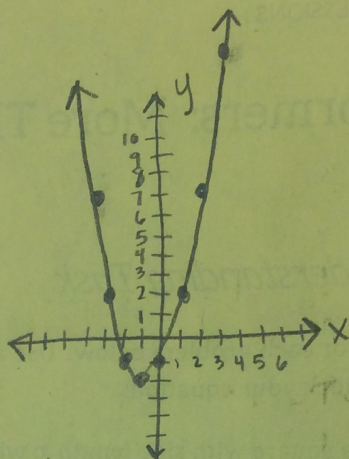
shifted right 3
shifted down 1
stretched by 2

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

x	y
0	17
1	7
2	1
3	-1
4	1
5	7

3.

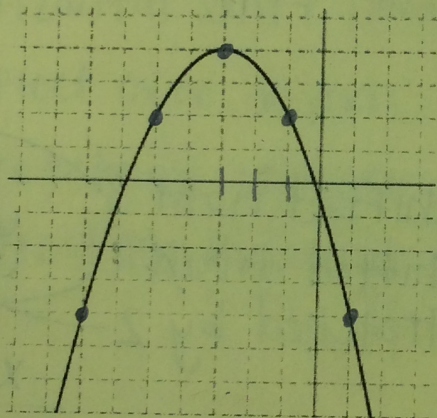
x	f(x)
-4	7
-3	2
-2	-1
-1	-2
0	-1
1	2
2	7
3	14
4	23



shifted left 1
shifted down 2

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

4.



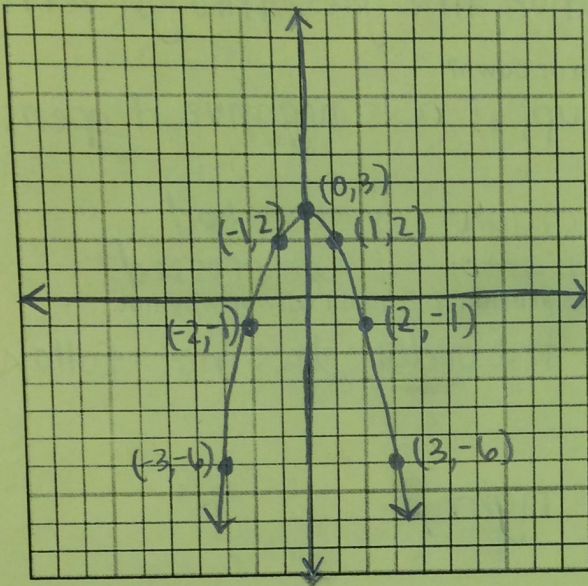
shifted left 3
shifted up 4
reflected over x-axis
compressed by $\frac{1}{2}$

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

x	y
-7	-4
-6	$-\frac{1}{2}$
-5	2
-4	$3\frac{1}{2}$
-3	4
-2	$3\frac{1}{2}$
-1	2
0	$-\frac{1}{2}$
1	-4

Graph each equation without using technology. Be sure to have the exact vertex and at least two correct points on either side of the line of symmetry.

5. $f(x) = -x^2 + 3$
 ↑ up 3
 ↓ reflect over x-axis

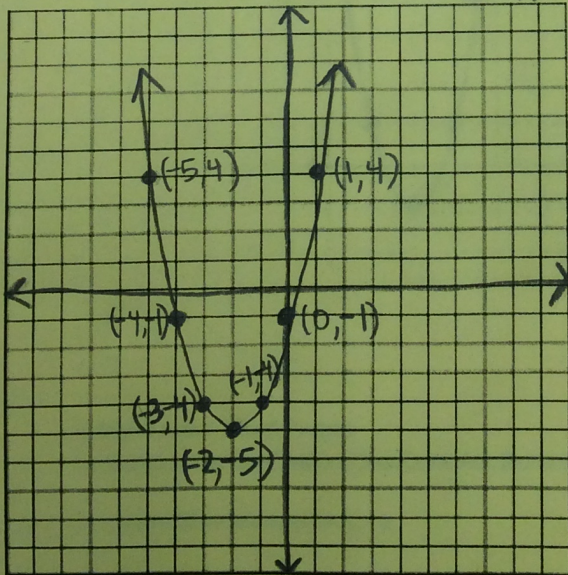


x	y
-3	-6
-2	-1
-1	2
0	3
1	2
2	-1
3	-6

max point: (0, 3)
 domain: $(-\infty, \infty)$
 range: $(-\infty, 3]$
 increasing: $(-\infty, 0)$
 decreasing: $(0, \infty)$
 line of symmetry: $x = 0$

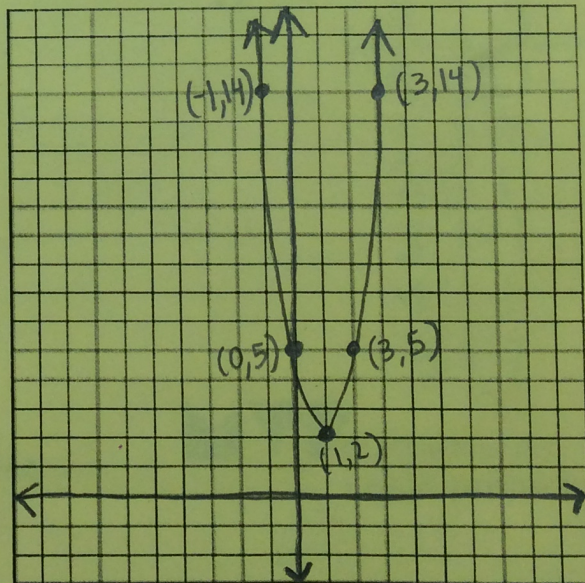
6. $g(x) = (x + 2)^2 - 5$
 ↓ left 2
 ↑ down 5

x	y
-2	-5
-1	-4
0	-1
1	4
2	11



min point: (-2, -5)
 domain: $(-\infty, \infty)$
 range: $(-5, \infty)$
 increasing: $(-2, \infty)$
 decreasing: $(-\infty, -2)$
 line of symmetry: $x = -2$

7. $h(x) = 3(x - 1)^2 + 2$
 ↑ stretch by 3
 ↑ up 2
 right 1



min point: (1, 2)
 domain: $(-\infty, \infty)$
 range: $(2, \infty)$
 increasing: $(1, \infty)$
 decreasing: $(-\infty, 1)$
 line of symmetry: $x = 1$

x	y
-3	50
-2	29
-1	14
0	5
1	2
2	5
3	14
4	29

8. Given: $f(x) = a(x - h)^2 + k$

a. What point is the vertex of the parabola?

(h, k) h moves vertex along x-axis
 k moves vertex along y-axis

b. What is the equation of the line of symmetry?

$x = h$ Symmetry equation line goes through vertex

c. How can you tell if the parabola opens up or down?

if a is positive it opens up, if a is negative it opens down

d. How do you identify the dilation?

the value of $|a|$, if $|a| > 1$ graph is stretched
if $0 < |a| < 1$ graph is compressed

9. Does it matter in which order the transformations are done? Explain why or why not.

Yes, graph is different if the order does not follow order of operations.

1. horizontal shift (left or right)

2. reflect over x-axis

3. stretch or compress

4. vertical shift (up or down)