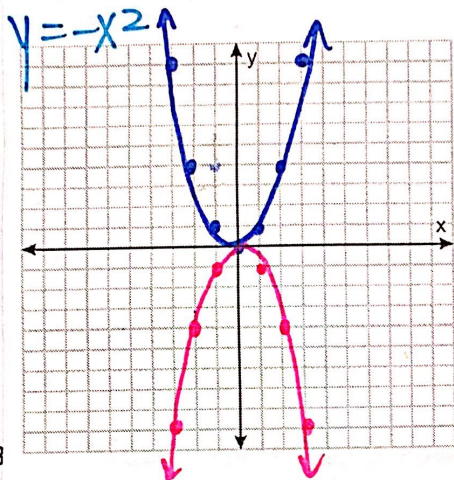
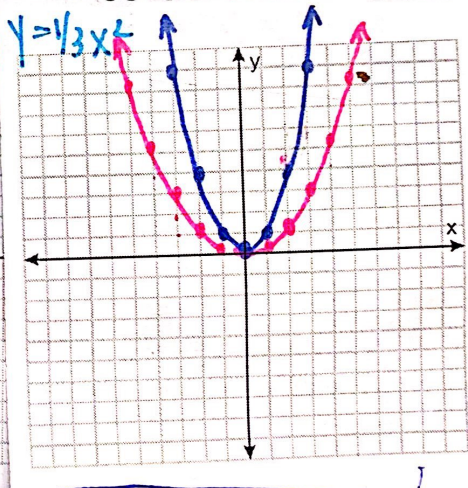
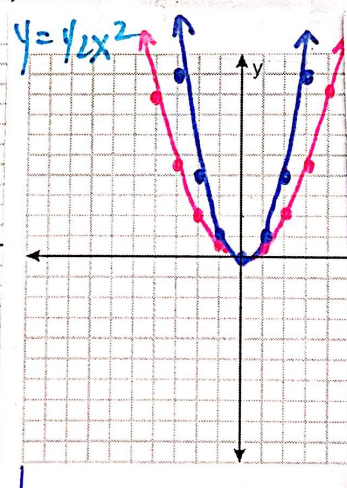
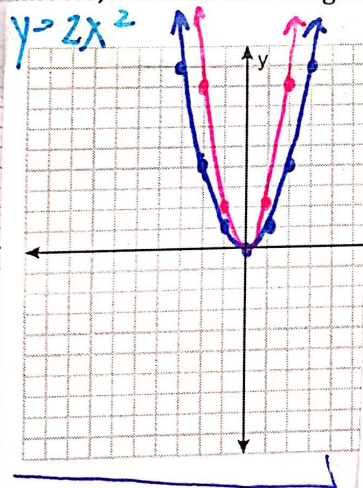
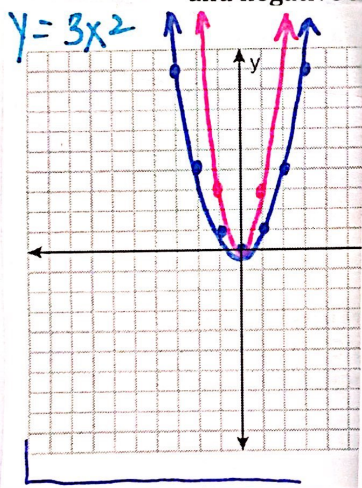


7. Optima thought that #6 was very tricky and hoped that multiplication was going to be more straightforward. She decides to start simple and multiply by -1, so she begins with $y = -x^2$. Predict what the effect is on the graph and then test it. Why does it have this effect?



"Flipped"
↓
Reflection over the
X-axis.

8 at one was easy. She decides to end her investigation for the day by determining the effect of a multiplier, a , in the equation: $y = ax^2$. Using both positive and negative numbers, fractions and integers, create at least 4 tables and matching graphs to



Vertical stretch \Rightarrow Make graph skinnier

Vertical compression \Rightarrow Make graph wider

Big Ideas - Day 2

$$f(x) = \underline{\underline{a}}(x-h)^2 + k$$

Investigated how "a"
transforms the graph

if "a" is negative the graph
"flips" or reflects over
the x-axis.

if the numerical part of "a"
is bigger than 1 (ex: $4x^2, 3x^2, 9x^2$)
the graph will get skinny. This
is a Vertical Stretch.

if the numerical part of "a" is between
0 and 1 (ex: $\frac{1}{2}x^2, \frac{1}{3}x^2, \frac{1}{4}x^2$) the graph
will get wider. This is a
Vertical Compression.

Unit 4 Day 2

Summary

a: a causes the graph to get Wider or thinner, also called a vertical Compression or stretch

- If $|a| > 1$, the result is a vertical Stretch by a scale factor of $|a|$.
- If $0 < |a| < 1$, the result is a vertical Compression by a scale factor of $|a|$.
(fraction)

If a is negative, the graph is Reflected. (flipped) over the x-axis.

I. Describe the transformation(s) from the parent function $f(x) = x^2$ and identify the vertex of $g(x)$.

1. $g(x) = -(x-5)^2$ (5,0)
Reflects over the x-axis
Right 5
2. $g(x) = -3(x+9)^2 - 8$ (-9, -8)
Reflect over the x-axis.
vertical stretch by a factor of 3
left 9, down 8
3. $g(x) = -0.5x^2 - 1$ (0, -1)
Reflect over the x-axis
vertical compression by a factor of 0.5, down 1
4. $g(x) = \frac{1}{2}(x+3)^2 - 2$ (-3, -2)
vertical stretch by a factor of 1/2, left 3, down 2
5. $g(x) = -\frac{1}{3}(x-5)^2 + 0$ (5, 0)
Reflect over the x-axis
vertical compression by a factor of 1/3
Right 5
6. $g(x) = 4.5x^2 + 8$ (0, 8)
vertical stretch by a factor of 4.5, up 8.

II. Identify the vertex and write an equation in vertex form to represent the transformed function $h(x)$ given the parent function $f(x) = x^2$.

7. Vertical stretch by a scale factor of 3, horizontal shift left 5, vertical shift down 2, reflect over the x-axis

$$(-5, -2) \quad h(x) = -3(x - -5)^2 - 2 = -3(x+5)^2 - 2$$

8. Horizontal shift right q units, vertical compression by a scale factor of r , vertical shift t units up

$$(q, t) \quad h(x) = r(x-q)^2 + t$$