Investigating Graphs of Quadratic Functions

$y=x^2$ versus $y=ax^2$

1). Graph $y=x^2$ on the graphing calculator. Write down the vertex and the line of symmetry.

Vertex: Line of Symmetry:

2) Now graph $y=2x^2$ Compare the graph from number 1 to this graph.

       Do they both have the same vertex and line of symmetry?
       What do you notice as a difference between the two graphs?

3) What happens when we put a fraction such as $\dfrac{1}{2}$ in front of x^2? What about $\dfrac{1}{4}$? Or $\dfrac{1}{10}$?
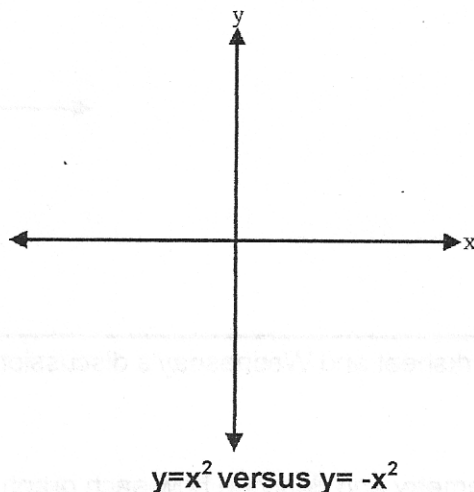
4) How does the coefficient in front of x^2 affect the graph?

5) Write a quadratic function that would have a wide parabola: _____

6) Write a quadratic function that would have a thin parabola: _____

7) Does the line of symmetry or vertex change by putting a number in front of x^2? _____

8) Graph $y=3x^2$ without the calculator using at least the vertex and two other points.

$y=x^2$ versus $y= -x^2$

9) Write a quadratic function that has an upward shape parabola: _____

10) Write a quadratic function that has a downward shape parabola: _____

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$y=x^2$ versus $y= x^2+ 3$

11) When happens when we graph $y = x^2 +3$ on our calculators? Did the line of symmetry and vertex change?

12) Using the variable c in the equation $y = x^2 +c$, where c is a real number, how does c change the graph?

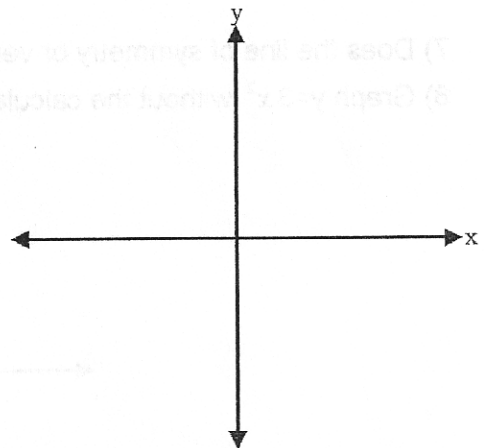13) Graph $y = x^2 +8$ (using at least 3 ordered pairs)
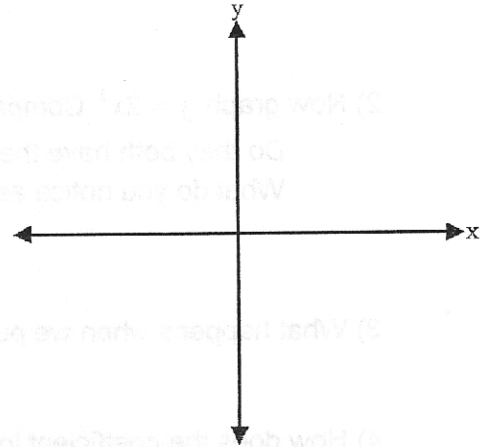
$y=x^2$ versus $y= (x- 2)^2$

14) Graph $y = x^2$ and $y = (x-2)^2$ simultaneously on your calculator. What happens to the parabola?

15) Write the quadratic function that describes the parabola shifting 4 units to the left:

y=_____

16) Without using the graphing calculator, graph $y = (x-5)^2$
(use at least three ordered pairs including the vertex)

Based on the results from this worksheet and Wednesday's discussion, compare $y = x^2$ to the following equations:

17) List the vertex and line of symmetry and describe how each graph shifts

1. $y = \frac{1}{9}x^2$ 2. $y = -10x^2$ 3. $y = x^2 +3.5$ 4. $y = (x+5)^2$ 5. $y = 3(x+3)^2 +2$