Graphing Simple Quadratic Equations

A quadratic equation is given in the form \( y = ax^2 + bx + c \), where \( a, b, \) and \( c \) are all constants. In this case, we are only going to be working with quadratics equations of the form \( y = ax^2 \). The graph of these types of equations is called a parabola.

1. Open MathGV.exe and pull up a 2-d Cartesian plane.

2. Graph the following parabolas on a single 2-d Cartesian grid. Transfer them to a sheet of graph paper as you graph each one.

   When graphing the following on your paper, use 1, 0, –1 for values of \( x \) and plot each graph in different colors in order to distinguish between graphs.

3. Graph \( y = x^2 \)

4. Graph \( y = 2x^2 \)

5. Graph \( y = 5x^2 \)

6. Graph \( y = \frac{1}{2}x^2 \)

7. Graph \( y = \frac{1}{10}x^2 \)

8. Where would the graph for \( y = 3x^2 \) lie with respect to the other graphs?

9. What would the graph for \( y = \frac{1}{100}x^2 \) look like?

10. As “a” gets closer to 0, what happens to the graph of \( y = ax^2 \)? ______________
    __________________________________________________________________

11. What happens when \( a = 0 \)? ________________________________________________________________________

12. What do you think happens when “a” becomes a negative number? ______________
    ________________________________________________________________________

13. Describe what you think \( y = -x^2 \) should look like. _________________________
    ________________________________________________________________________
    (Check your answer against the value \( a = -1 \) on MathGV.)
In summary:

a. If $a > 0$, the graph turns _______________. (Upwards or downwards?)

b. If $a = 0$, the graph is a ____________.

c. If $a < 0$, the graph turns ________________. (Upwards or downwards?)

d. The closer “a” is to 0, the ____________ (wider or narrower) the parabola is.

e. The further “a” is away from 0, the ____________ (wider or narrower) the parabola is.