1.5 Vertex Form

Directions: Starting with the parent function $f(x) = x^2$, graph the given transformation in the following problems and give the vertex after graphing it.

1. $f(x) = (x - 1)^2 + 2$
2. $f(x) = 3(x - 2)^2 - 5$
3. What do you notice about where the vertex is and the functions given?
4. Simplify the two equations you graphed by multiplying out the square and combining like terms:
5. What do you notice about the coefficient of the two functions after you multiply them out how does it relate to the graph?
6. What do you notice about the constant of the equation and the y-intercept of the graph?

Part II: In this part you are going from Vertex Form to Standard Form of an equation:

1. $f(x) = (x - 3)^2 + 2$

2. $f(x) = 2(x + 5)^2$

3. $f(x) = (x + 4)^2$

4. $f(x) = 3(x - 2)^2 - 6$

5. $f(x) = (x + 3)^2 + 4$

6. $f(x) = (x + 1)^2 + 1$

7. $f(x) = (x + 4)^2 - 3$

8. $f(x) = \frac{1}{2}(x + 2)^2 - 3$

9. $f(x) = -(x + 4)^2 + 1$

10. $f(x) = (x - 1)^2 + 4$

For each function above, identify the following:

- *Stretch or Compression*
- *Stretch or Compression Factor (If applicable)*
- *y-intercept*

Vertex Form: $y = a(x - h)^2 + k$

Standard Form: $y = ax^2 + bx + c$