Step 1 Graph $Y_1 = x^2$ in a Standard Window. Leave this equation in Y_1 for the remaining steps.

What are the coordinates of the Vertex?

Step 2 Graph $Y_2 = x^2 + 4$.

Describe how this graph is related to the graph of $Y_1 = x^2$

What are the coordinates of the Vertex?

Step 3 Graph $Y_2 = x^2 - 6$.

Describe how this graph is related to the graph of $Y_1 = x^2$

What are the coordinates of the Vertex?

Step 4 Graph $Y_2 = -x^2 - 3$.

Describe how this graph is related to the graph of $Y_1 = x^2$

What are the coordinates of the Vertex?

Step 5 Describe how the value of c affects the graph of $y = ax^2 + c$.

Step 6 Write the equation of the parabola described.

a. The parabola has the same shape as $y = 2x^2$ but has moved 8 units down.

b. The parabola has the same shape as $y = 3x^2$ but has moved 2 units up and opens downward.

Step 7 Without using a calculator, match each equation below with its graph.

1. $y = 4x^2 - 3$ 2. $y = -2x^2 + 4$ 3. $y = x^2 - 3$ 4. $y = -5x^2 + 4$ 5. $y = 7x^2 + 4$