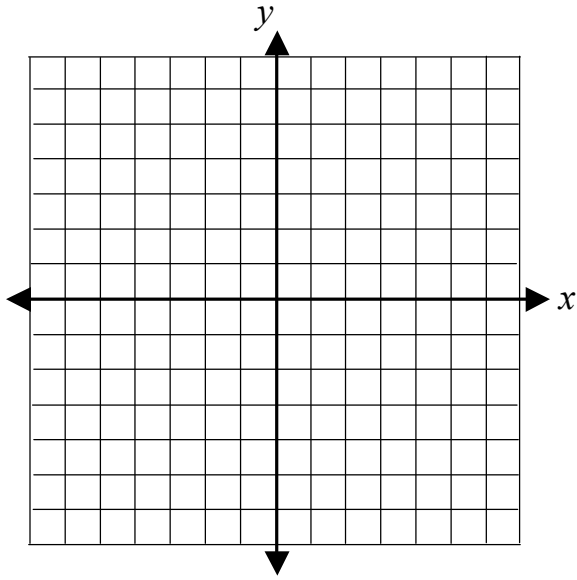
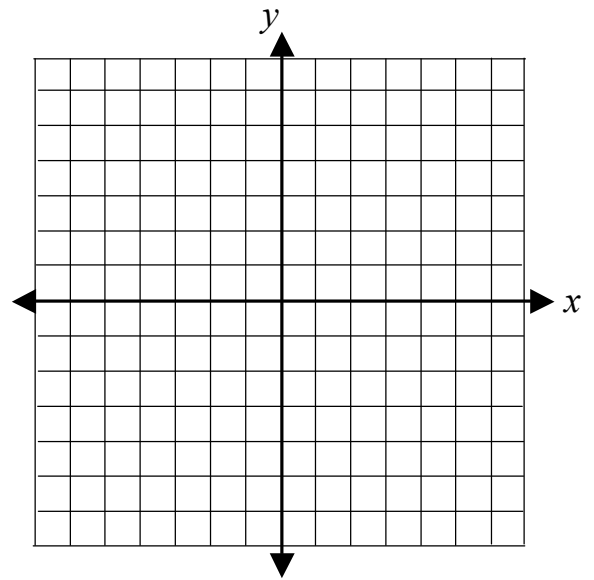


Graph the equations. Explain the similarities and differences between the graphs.

A.)  $y = -x^2 - 3$



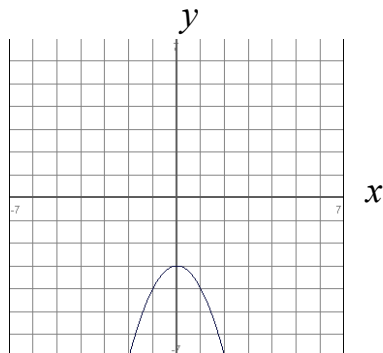
B.)  $y = 2x^2 - 3$



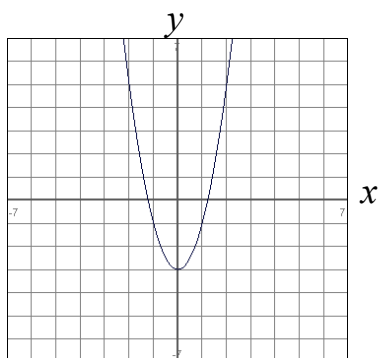
Similarities	Differences

## Sample Top Score Response:

A.)  $y = -x^2 - 3$



B.)  $y = 2x^2 - 3$

Similarities

- The graphs are both parabolas
- The graphs have the same  $y$ -intercept:  $(0, -3)$
- The graphs have the same axis of symmetry:  $x = 0$
- The graphs have the same vertex:  $(0, -3)$

Differences

- The graph of A is concave down, while the graph of B is concave up
- The graph of A is wider than the graph of B (The graph of B is narrower than the graph of A).
- The graph of A has no  $x$ -intercepts, while the graph of B has two  $x$ -intercepts:  $\left(\pm \frac{\sqrt{6}}{2}, 0\right)$
- The vertex of the graph of A is a maximum, while the vertex of the graph of B is a minimum.

**2 points:**

Student graphs both equations correctly and describes two similarities and two differences between the graphs. Demonstrates an understanding of concavity, intercepts, axis of symmetry, vertex and wide/narrow shape when compared to the parent function .

**1 point:**

- Student graphs both equations correctly and describes one similarity and one difference between the graphs.
- Student graphs one equation correctly and describes one or two similarities and one or two differences between the graphs.

**0 points:**

- Student graphs both equations incorrectly.
- Student does not describe similarities or differences between the graphs.

**Interpreting Functions****F-IF****Analyze functions using different representations**

7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

- Graph linear and quadratic functions and show intercepts, maxima, and minima.