Name _____ Date _____

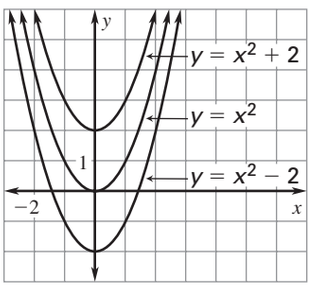
Objective 5
TEKS A.9.C Review

A.9.C Investigate, describe, and predict the effects of changes in *c* on the graph of $y = ax^2 + c$.

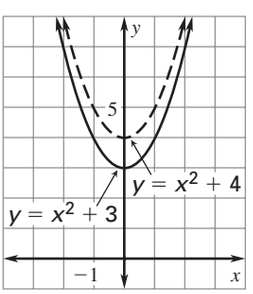
Functions in the form $y = ax^2 + c$ are called quadratic functions. The graph of a quadratic function is a parabola.

The value of c translates the graph of the function $y = ax^2$ up or down.

The point $(0, c)$ is the vertex of the graph of $y = ax^2 + c$. The graphs of $y = x^2 + 2$ and $y = x^2 - 2$ have the same shape as the graph of $y = x^2$. The graph of $y = x^2 + 2$ is translated 2 units up from $y = x^2$. The graph of $y = x^2 - 2$ is translated 2 units down from $y = x^2$.



EXAMPLE How will the graph of the function $y = x^2 + 3$ be affected if the function is changed to $y = x^2 + 4$?



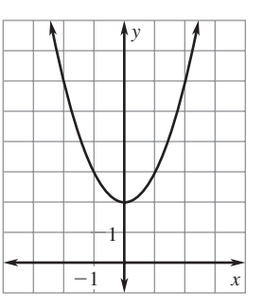
The vertex of the graph of $y = x^2 + 3$ is (0, 3).

Notice that the value of c in $y = x^2 + 4$ is 1 unit greater than the value of c in $y = x^2 + 3$. This means that the graph of $y = x^2 + 4$ is **1 unit higher** than the graph of $y = x^2 + 3$.

The vertex of the graph of $y = x^2 + 4$ is (0, 4).

Changing the function $y = x^2 + 3$ to $y = x^2 + 4$ translates the graph up 1 unit. The vertex of the new graph is (0, 4).

YOU DO IT How will changing the function $y = x^2 + 2$ to $y = x^2 + 1$ affect the graph of $y = x^2 + 2$?



The vertex of the graph of $y = x^2 + 2$ is **(0, 2)**.

How does the value of c in $y = x^2 + 1$ compare to the value of c in $y = x^2 + 2$? **The value of *c* in $y = x^2 + 1$ is 1 unit less.**

The vertex of the graph of $y = x^2 + 1$ is **(0, 1)**.

Changing $y = x^2 + 2$ to $y = x^2 + 1$ will translate the graph of $y = x^2 + 2$ **1** unit **down**.

The vertex of $y = x^2 + 1$ is **(0, 1)**.