**Section 2–6A: Families of Functions (Translation)**

**Introductions:**

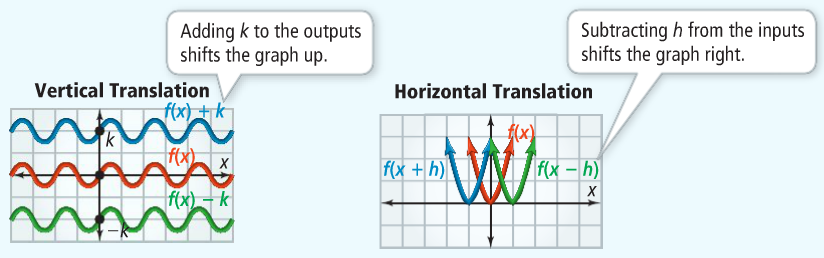
Different non-vertical lines have different slopes, or *y*-intercepts or both. They are graphs of different linear functions. For two such lines, you can think of one as a ***transformation*** of the other. There are sets of functions, called ***families***, in which each function is a transformation of a special function called the ***parent***.

The linear functions form a family of functions. Each linear function is a transformation of the function . The function is the ***parent*** linear function. A **parent function** is the simplest form in a set of functions that form a family. Each function in the family is a **transformation** of the parent function.

One type of transformation is a **translation**. A translation shifts the graph of the parent function horizontally, vertically, or both without changing shape or orientation.

For a positive constant and a parent function , is a **vertical translation**.

For a positive constant and a parent function , is a **horizontal transition**.



**Recall:**

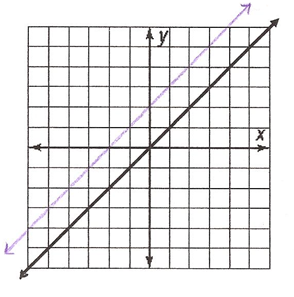
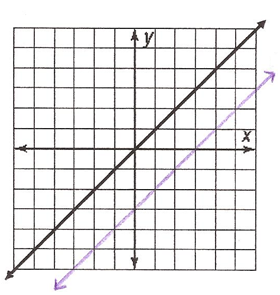
**Linear Functions** – all graphs of linear functions are lines that are transformation of the ***parent linear function*** or .

**Looking Ahead: (Chapter 4 Section 1)**

**Quadratic Functions** – all graphs of quadratic functions, called parabolas, are a transformation of the ***parent quadratic function*** or .

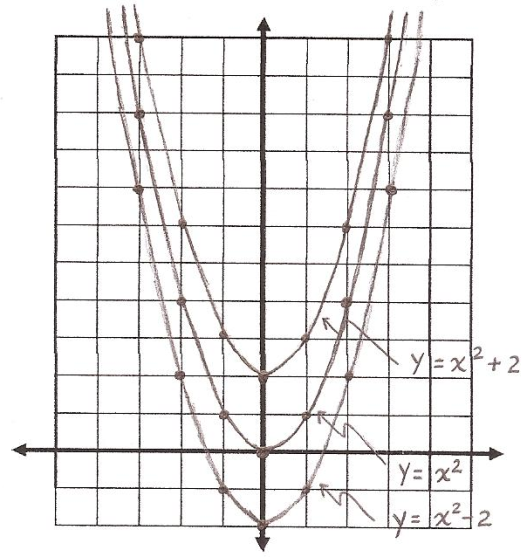
**Example 1: Vertical Translation**

Graph each linear function. Compare it to the graph of the parent function, .

**A.**  **B.**

**Example 2: Vertical Translation**

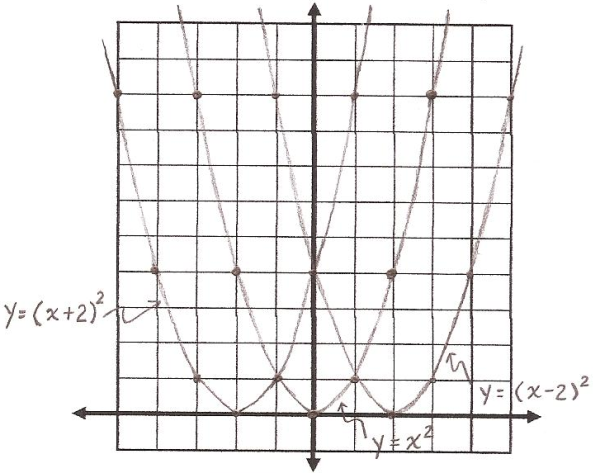
Complete the table and graph all three functions on the same coordinate plane.



|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Example 3: Horizontal Translation**

Complete the table and graph all three functions on the same coordinate plane.



|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |