Name _____ Date _____

LESSON 3.7

Investigating Algebra Activity: Families of Linear Functions

For use before the lesson "Graph Linear Functions"

Materials: desk, textbooks, graph paper, meter stick or metric ruler

QUESTION **What are some relationships that exist between members of a family of linear functions?**

EXPLORE **Graph families of linear functions**

In this activity, you will work in a small group. You will use a linear equation $y = mx + b$ to model the height y from the floor to the top of a stack of x books that are m centimeters thick sitting on a desk b centimeters high.

STEP 1 Measure and record

Measure the thickness of your algebra textbook. Measure the height of the top of your desk to the floor. Record your measurements.

STEP 2 Write and graph model

Write a model for the height y from the top of a stack of x algebra textbooks the same size as yours sitting on your desk. Then graph your model.

STEP 3 Measure and record

Measure the thickness of your English textbook.

STEP 4 Write and graph model

Repeat Step 2 using your English textbook, graphing your model in the same coordinate plane.

STEP 5 Repeat

Repeat Steps 3 and 4 using another textbook.

DRAW CONCLUSIONS **Use your observations to complete the following.**

1. Functions that have characteristics in common can be thought of as a *family of functions*. List all the characteristics that the functions have in common. List all of the characteristics that their graphs have in common.

2. Suppose in the Explore that you used the same algebra textbook, but you used a table with a height of 65 centimeters, a desk with a height of 72 centimeters, and the floor. Graph these models in the same coordinate plane. What characteristics do these functions share? What characteristics do their graphs share?

3. What characteristics are shared by the family of functions in which $m = 1$?

4. What is true about the family of linear functions with graphs passing through the point (0, 0)?