

Introduction

In this activity, students will model a linear relationship and use a best-fit line to solve problems.

Grades 6-8

NCTM Algebra Standards

- Represent and analyze mathematical situations and structures using algebraic symbols
- Use symbolic algebra to represent situations and to solve problems, especially those that involve linear relationships

Files/Materials Needed

Keyboard Speed vs Exper.act, *EXPER.8xl*, *SPEED.8xl*, *Slope and Y-Intercept.act*

1

- Launch TI-Navigator™ on the computer and start the session.
- Have each student log into NavNet on their calculator.

2

- Load the activity settings file *Keyboard Speed vs Exper.act*.
- Load lists *EXPER.8xl* and *SPEED.8xl*. You must load both lists at the same time to later make a scatter plot. To do this, hold down the **Ctrl** button on the keyboard to select both lists, and then click the LOAD button.
- Introduce the scenario.** The two lists contain a sampling of twelve data points relating keyboarding speed in words per minute to the number of weeks of training experience. We would like to find a way to model this situation so that we can solve problems.
- To set up the scatter plot in Activity Center, select the **List-Graph** tab, and then click the Configure Plots button. Choose any one of the plot mark types and select *EXPER* for the X-List and *SPEED* for the Y-List. Click the OK button.

3

- Start the activity. Instruct students to visually estimate a slope and y -intercept for a line that appears to fit the data in the best possible way. They may select **PLOT** to see how well their equation matches the points. They may select **EQN** to keep experimenting with different values for the slope and y -intercept. If any students accidentally send, they may continue to experiment and resend their equation when ready.
- When the students find an equation they feel is a good fit for the data, have them send it to Activity Center. Also, have each student write down their slope and y -intercept on a piece of paper. These numbers will be used in the next step.
- Stop the activity and discuss the results.

4

- Load the activity settings file *Slope and Y-Intercept.act*.
- Select the **List** tab and start the activity. Have each student send their slope and y -intercept from step 3b.
- Stop the activity and reconfigure the activity settings by pressing the **Configure** button so that students start with **Existing activity lists**.
- Start the activity to send the class data to the student calculators.

If the Line Fits

5

Have students log out of NavNet and find the mean slope and y -intercept on their calculators by selecting 2nd LIST 3 : **mean**. Lists SLOPE and YINT can be accessed by pressing 2nd LIST and then using the arrow keys to find the list names and pressing ENTER to select.

```
mean(LSLOPE)
4.083333333
mean(LYINT)
16.4
```

Note: The linear regression model yields a slope of approximately 3.965 and a y -intercept of approximately 16.701, so expect to get numbers that are close to these values.

6

- Recall the scatter plot by selecting the **List-Graph** tab, and choose Data Set 1: (EXPER, SPEED) from the pull-down menu below the Configure Plots button.
- Select the **Graph-Equation** tab to enter the class model. Enter the equation in the $Y=$ space using the class average slope and y -intercept and press Add.
- Select **Contribute: Equations** and configure the settings so that students start with **Equations below**. Enter the equation into $Y1$.
- Have students log back into NavNet and start the activity to send the equation to the student calculators.

7

Use **Quick Poll** (with *Open Response*) to ask questions such as:

- What is the average gain in keyboarding speed per week? Round to the nearest tenth.*
- What is the initial average keyboarding speed at the beginning of the training? (Round to the nearest tenth.)*
- Predict the approximate keyboarding speed (WPM) of someone with 10 weeks of training experience.*
- Approximately how many weeks should it take to reach a keyboarding speed of 30 WPM?*
- When people enter the course, approximately how many WPM are they able to type?*
- As people work their way through this course, about how many WPM do they gain each week?*