

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Catch A Thief with a Scatterplot**

A spreadsheet is comprised of rows and columns. The **rows** are labeled **numerically**; the **columns** are labeled **alphabetically**. Each **cell** is found where a row and a column intersect and its address is noted with a letter and a number. A **function** is a mathematical relationship, which has only one **output** (answer) for each **input**. A graph is a representation of mathematical data.

Essential Questions:

1. What tools are included in the Lists and Spreadsheets application that will help the student be more efficient, effective, and productive in examining numerical data?
2. How is a linear regression generated from data in a table?
3. How can various sampling strategies create more reliable predictions?
4. What difficulties could be encountered in learning how to use a spreadsheet, and how can these problems be overcome?

Objectives:

1. Use correct terminology to identify the features of Lists and Spreadsheets.
2. Create a spreadsheet and use that spreadsheet to manipulate data.
3. Graph data from a spreadsheet.
4. Make a reliable prediction.

**I. TI-Nspire Lists and Spreadsheets**

*The students are to make a judgment about the height of a thief who left a shoeprint at the scene of a crime. The length of the shoeprint corresponds to a woman's size 7 shoe, or a man's shoe that is size five. Each student will collect and organize data, create a scatterplot, then determine a linear regression to describe the data, then make a judgment about the height of the unknown person.*

- A. *Each student should stand with his/her back to the wall with attached measurement instruments (yardstick, meter sticks, or measuring tape.) The height of the student will be marked, then recorded on a projected transparency or in Column A of Lists and Spreadsheets from TI-Nspire software that is being projected on a screen.*

Materials: Yardsticks or meter sticks, Masking tape, Projector, Transparency of table or TI-Nspire computer software, Activity sheets

---







- B. Next, each student should measure the length of his/her shoe.*
- C. Record this data in the projected table.*
  
- D. Each student should complete an individual table and enter the class data*

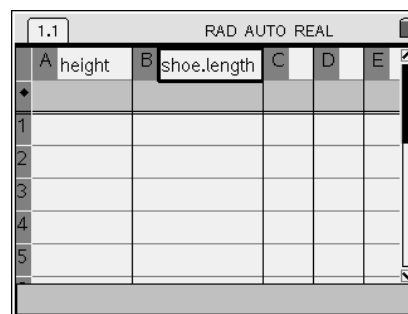
Title:

Name:	Student	
	Height in inches	Shoe Length






- 1. After turning on the TI-Nspire handheld, Choose Home and select 3. Lists and Spreadsheets. Press Enter or the Click*

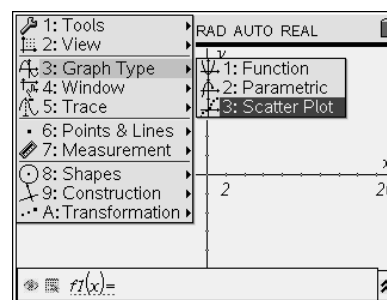
### Button

2. Highlight the white space just to the right of A in column A, type “height”.
3. While the space is still highlighted, press   to choose Menu, Action. Press the **RIGHT ARROW** on the navpad for **ACTION** choices.
4. From this menu, highlight **2.Resize**, and press .
5. With the entire column highlighted, press the right arrow on the navpad to widen the column. Make sure the entire text is visible, then press  and press .
6. Highlight the white space just to the right of B in column B, type “Shoe.length” and press .
7. Use the same procedure to widen column B as you used to widen Column A.
8. Enter individual heights of students with corresponding shoe length, in Column A and Column B.








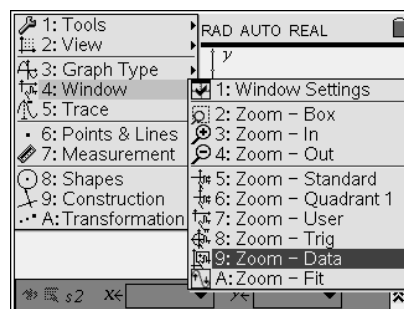
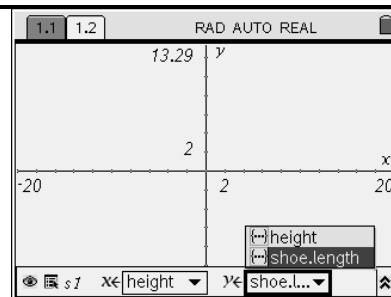
### E. Analyzing Data - Graph




1. Use the shortcut   to insert a new page in your document.
2. Choose 2:Add Graphs & Geometry
3. Press    to choose Menu, 3:Graph Type, 3:Scatter Plot

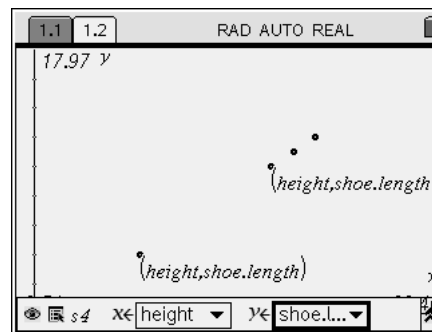


Materials: Yardsticks or meter sticks, Masking tape, Projector, Transparency of table or TI-Nspire computer software, Activity sheets

4. Press  to open the  $x$ -values, insure “height” is highlighted and press  
5. Move to the right to highlight the  $y$ -values list, and press 
6. Select shoe.length, and press 



7. Press    to choose Menu, 4:Window, 9:Zoom – Stat.



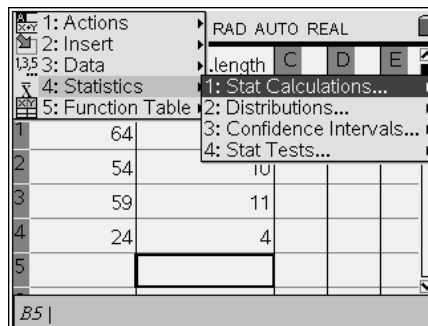
### F. Analyzing Data – Linear Regression

Next, determine the regression equation for the set of data.

1. Press   (to the left of the NavPad) to

*return to the spreadsheet.*

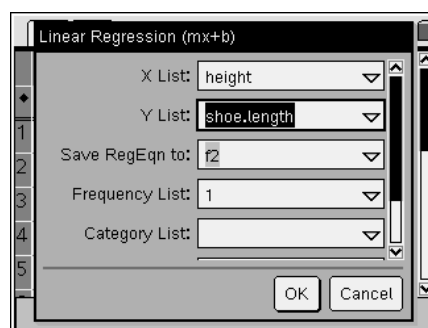
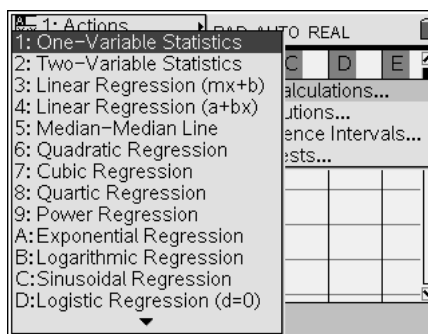
2. Press **(menu)** **(4)** **(1)** to choose Menu, 4:Statistics, 1:Stat Calculations



3. Press **(3)** to choose 3:Linear Regression  
( $mx + b$ )

4. The Linear Regression set up box will appear on the screen.

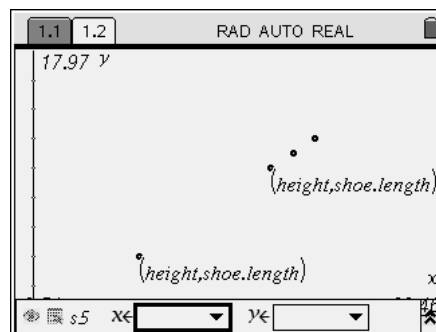
- a. Press the down arrow on the NavPad cursor control to choose 'height,' and press **(OK)**
- b. Press the **(tab)** key to change to the Y-list. Press the down arrow key and choose 'shoe.length.'
- c. Press the **(tab)** until OK is highlight and press the **(OK)** button.



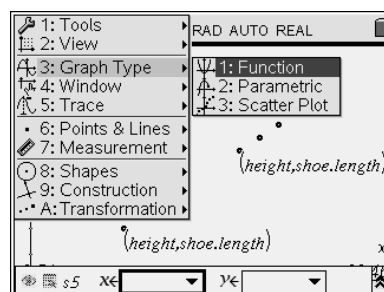
Materials: Yardsticks or meter sticks, Masking tape, Projector, Transparency of table or TI-Nspire computer software, Activity sheets

1.1	1.2	RAD AUTO REAL			
1	2	3	4	5	6
ht	shoe.length				
			=LinR		=LinR
1	64	12	Title	Line...	Title
2	54	10	Reg...	m*x...	Reg...
3	59	11	m	.2	m
4	24	4	b	-.8	b
5			r <sup>2</sup>	1.	r <sup>2</sup>
F1   ="Linear Regression (mx+b)"					

5. Press  $\text{ctrl}$   $\text{[2]}$  to return to the Graphs & Geometry page.



6. Press  $\text{menu}$   $\text{[3]}$   $\text{[1]}$  to choose Menu, 3:Graph Type, 1:Function.



Materials: Yardsticks or meter sticks, Masking tape, Projector, Transparency of table or TI-Nspire computer software, Activity sheets

7. Press the  $\blacktriangle$  key so that the  $f1(x)$  appears in the Entry Line, and then press the  $\text{enter}$  key to discover the Linear Regression that describes this data.

8. At the scene of the crime, the shoeprint measured 14 inches long. Use the linear regression to predict the height of the suspect. Show your work, then state, in writing, your conclusion. Justify your answer.

---



---



---



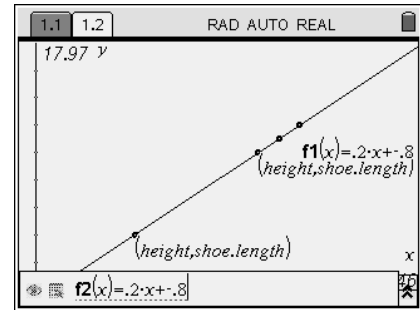
---



---



---



### Assessment and evaluation

- *Did all students measure in the same units? Will the results change if the units are not all the same? Justify your answer. Why or why not?*
- *Will the sample size make a difference in the reliability of the prediction? Justify your answer.*

### Activity extensions

- *Shoe sizes for men and women differ in America. Will shoe length determine if the shoe was worn by a man or by a woman?*
- *Research the differences in shoe size for men and women. Is there a direct correlation of foot length and size for men and/or for women. If both sets of data are graphed, what relationship is revealed?*