Is the Slope Significant?

Netbook weight vs. cost

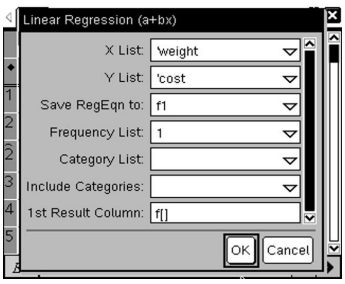
In this activity, we will look at the weight of a netbook vs. its cost. Below is the data for 22 randomly selected netbooks.

Weight (pounds):	2.8	2.9	2.8	2.4	2.9	2.9	2.9	2.7	2.8	2.8	3.2
Cost (dollars):	370	350	330	370	360	400	340	340	350	350	360
Weight (pounds):	2.7	2.9	2.7	2.6	2.8	2.4	2.4	2.6	2.5	2.5	2.5
Cost (dollars):	310	330	320	380	335	350	300	280	500	290	500

1. Open a New Document and select *Add Lists & Spreadsheet*.
2. Name column A **weight** and enter the data from the table above.
3. Name column B **cost** and enter the dollar amounts for the corresponding weights.
4. Insert a Data & Statistics page to display the scatterplot of weight vs. cost.
   - Press ctrl I and select *Add Data & Statistics*.
   - Press tab and select **weight** for the horizontal axis.
   - Press tab again and select **cost** for the vertical axis.

Describe this scatterplot.

5. Press ctrl ◀ to get back to the *Lists & Spreadsheet*. Press menu, *Statistics*, *Stat Calculation*, *Linear Regression (a + bx)*. Select the same variables as shown.



Interpret the slope of this equation in context.

Now we will explore the significance of the slope calculated above. If there is a relationship between the weight and cost of the netbooks, how likely is it to get this slope? To determine this, let's randomize the costs and recalculate the slopes for the new regression lines.

6. Name column C **randcost**. In the formula bar, press (enter) and type **randsamp(cost,22,1).** Press (enter) and the costs have now been randomly reassigned.

7. Arrow over to the formula bar for column G. Press (enter) and change **cost** to **randcost.** The linear regression output will now be calculated for the randomized costs.

8. To capture the new slope, arrow to the first empty cell in column D. Press (enter) and define a new variable, **slope**. Type **slope** [:=] *g4*. The calculated slope should be displayed in bold.

9. Name column D **slopes**. In the formula bar, press (menu), *Data Capture*, *Automatic*. Press (var) and select **slope**. The list should now contain the calculated slope.

10. Refresh the spreadsheet to re-randomize the costs by pressing (ctrl)[R]. A new slope should now appear in the **slopes** list. Press and hold (ctrl) and then press [R] 30 times.

Display the slopes in a graph.

11. Press (doc▾), *Page Layout*, *Select Layout*, .

12. Press (menu), *Add Data & Statistics*. Press (tab) and select **slopes** for the horizontal axis.

Describe this graph.

Return to the *Lists & Spreadsheet* and refresh the spreadsheet 20 more times.

According to your distribution of slopes, how likely is the slope of the regression of weight vs. cost? Describe the significance of the slope and the relationship of between weight and cost of the netbooks.