Exploring Linear Regression in NETBOOKS: Part I

Is it possible to predict the battery life of a new netbook given its weight?

In the previous activity, *Exploring Scatterplots*, we looked at a plot of weight vs. battery life of netbooks. Now we will explore the possibility of predicting the battery life of netbooks.

1. Open **Netbook** from *My Documents*.

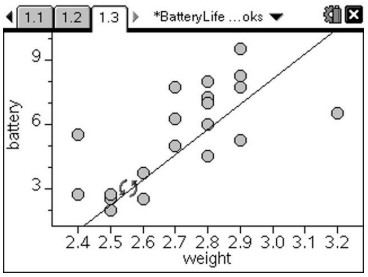
2. Create another scatterplot of **weight** vs. **battery**.

   - Insert another *Data & Statistics* page (ctrl I, *Add Data & Statistics*)
   - Add **weight** to the horizontal axis and **battery** to the vertical axis.

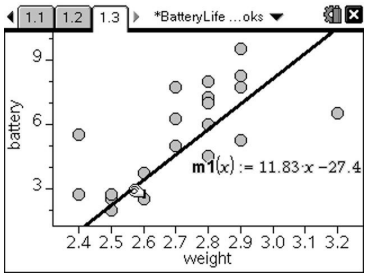
3. Within the scatterplot press menu, *Analyze*, *Add Movable Line*. This places a line on your scatterplot. Using the arrow keys and the ✋ to "grab" the line, you want to place the line so that it is approximately in the middle of the data. See the directions below for help.

   - When you arrow over the line you will see the pointer become one of two symbols, ↻ and ✥.
   - When one of the two symbols appears, press and hold ✋ to "grab" the line. Use the arrow keys to move the line.

   →To change the **slope**, arrow over the line until you see ↻.

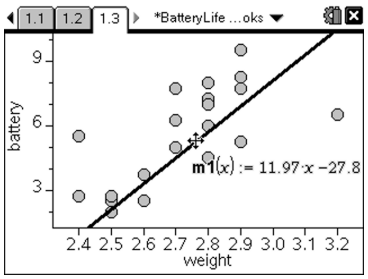


Click and hold ✋ until the ✋ appears. →



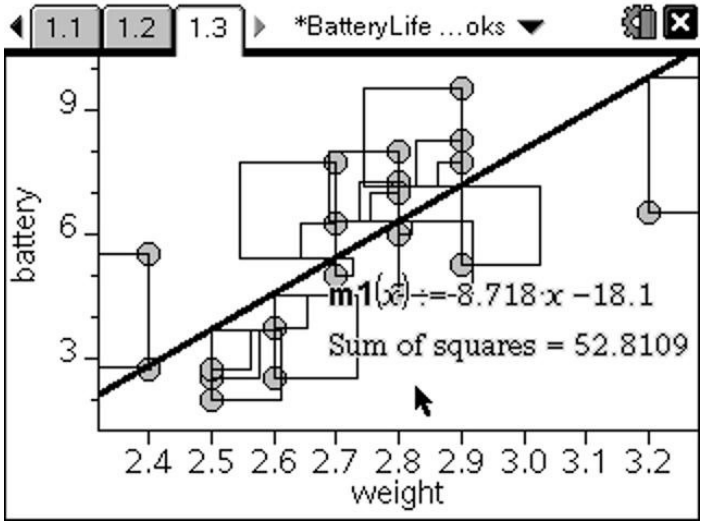
Move the arrows to change the slope of the line. Press ✋ again to release the line.

→To change the **y-intercept**, arrow over the line until you see ✥. Click and hold ✋ until the ✋ appears. Press the arrow keys to move the line up or down. Press ✋ again to release the line.



While you are moving the line, notice the equation near the bottom of your screen. The numbers in this equation should be changing as you move the line.

Once you get your line where you think it should be let's look at the residual squares. Press (menu), *Analyze*, *Residuals, Show Residual Squares*. Your screen should now look similar to the one below.



Using the same instructions from #6, start moving your line. Answer the questions below.

What happens to the *Sum of Squares* as your move your line? What does the *Sum of Squares* represent?

How will you know when to stop moving your line? Why?

When you feel the movable line has the best placement, record the equation of this line here.

What do the numbers in this equation mean with respect to the data on weight and battery life? Use full sentences to explain.

4. In your scatterplot, press (menu), *Analyze*, *Regression*, *Show Linear (a + bx)*. This line is called the Least Squares Line, or the Line of Best fit.

Record this equation here and answer the questions below.

a) **How does the Least Squares Line compare with the equation of your movable line? Be specific.**

b) **In your words, explain why this equation is considered the "line of best fit".**

c) **Rewrite the equation in terms of what the variables represent. Write a statement about what the slope of the equation means.**