

## Scatterplots-Exponential

Radioactive materials decay at a certain rate. Each material has its own rate of decay. These rates are computed by collecting data and then analyzing them. A scientist begins with a 100-gram sample and weighs the sample each week. Data from the measurements of a certain radioactive material are listed in the table below.

Week	Weight (in grams)
0	100
1	88
2	74
3	66
4	59
5	52
6	45

1. Enter the data into your calculator.
2. Graph the scatterplot.
3. Describe the pattern that you see.
4. Look at the data in the table. Between which two measurements was there exactly half of the original sample left?
5. Use your calculator to compute the exponential regression for this data.

6. In a perfect situation, the coefficient should be 100. Is it? If so, explain why. If not, explain why.
  
7. The base of the exponent explains the rate of decay. What is that rate? What does that mean in everyday language?
  
8. Graph the line  $y = 50$ . Find the point of intersection with this line and the exponential equation. How does this compare to your answer for #4?

## Keystrokes for the *fx-9750G Plus*

From the Main Menu, press 2 for STAT.

If there are data in List 1 and List 2, follow these directions:

- Press F6 (make sure that the highlighted cell is in List 1 by pressing the right/left/up/down arrow).
- Press F4 (delete all) then press F1 (yes).
- Repeat this process for List 2 if necessary.

Enter Data:

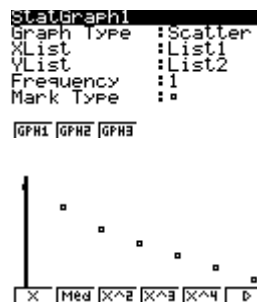
- Type the week data in List 1 (With appropriate cell highlighted, type numerical value then EXE to store.)
- Use the right arrow key to go over to List 2 and then type in the weight data.
- Make sure your data is matched up correctly and that you have 7 entries in both List 1 and List 2.

	List 1	List 2	List 3	List 4
1	0	100		
2	1	88		
3	2	74		
4	3	66		
5	4	59		

GRAPH CALC TEST EDIT DIST

Graph the scatterplot:

- Press F1 (graph) then F6 (set)
- Press down arrow key to Graph Type, press F1.
- Press down arrow key to XList then press F1 (List 1).
- Press down arrow key to Ylist then press F2 (List 2).
- The frequency should be 1 and you can choose the type of mark you would like to make.
- Press EXIT and then F1 for Graph 1.



To get the line of best fit:

- Press F6 (more options) and then press F2 to find an exponential regression line

```
ExpRes
a =99.0213471
b =-0.1312227
r =-0.9985064
r^2=0.99701522
y=a·e^bx
```

[COPY] [DRAW]

To see the line of best fit with the data:

- Press F6 (Draw)

