

Finding Your Way Around the TI-83+/84+ Graphing Calculator

Statistics 1

MathBits.com

Line of Best Fit

A line of best fit (or "trend" line) is a straight line that best represents the data on a scatter plot.

This line may pass through some of the points, none of the points, or all of the points.

You can examine lines of best fit with:

1. paper and pencil only
2. a combination of graphing calculator and paper and pencil
3. or solely with the graphing calculator

Example: Is there a relationship between the fat grams and the total calories in fast food?

Sandwich	Total Fat (g)	Total Calories
Hamburger	9	260
Cheeseburger	13	320
Quarter Pounder	21	420
Quarter Pounder with Cheese	30	530
Big Mac	31	560
Arch Sandwich Special	31	550
Arch Special with Bacon	34	590
Crispy Chicken	25	500
Fish Fillet	28	560
Grilled Chicken	20	440
Grilled Chicken Light	5	300

Paper and Pencil Solution:

1. Prepare a scatter plot of the data on graph paper.
2. Using a strand of spaghetti, position the spaghetti so that the plotted points are as close to the strand as possible.



3. Find two points that you think will be on the "best-fit" line. Perhaps you chose the points (9, 260) and (30, 530). Different people may choose different points.

4. Calculate the slope of the line through your two points (rounded to three decimal places).

5. Write the equation of the line. This equation can now be used to predict information that was not plotted in the scatter plot. For example, you can use the equation to find the total calories based upon 22 grams of fat.

Equation:

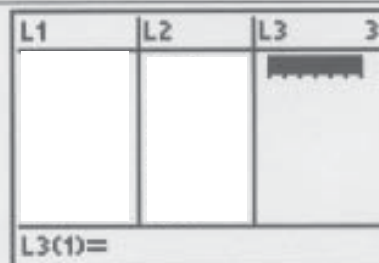
Prediction based on 22 grams of fat:

Different people may choose different points and arrive at different equations. All of them are "correct", but which one is actually the "best"? To determine the actual "best" fit, we will use a graphing calculator.

Graphing Calculator Solution:

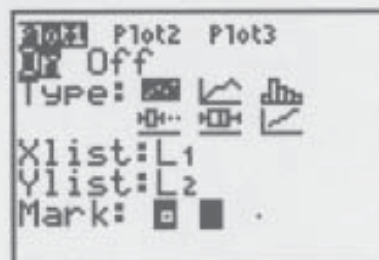
1. Enter the data in the calculator lists. Place the data in L_1 and L_2 .

STAT, #1**Edit**, type values into the lists



2. Prepare a scatter plot of the data. Set up for the scatterplot.

2nd StatPlot - choose the first icon - choices shown at right. Choose **ZOOM #9 ZoomStat**. Graph shown below.

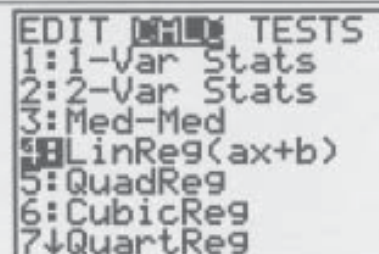


3. Have the calculator determine the line of best fit.

STAT → **CALC #4 LinReg(ax+b)**

Include the parameters L_1 , L_2 , Y_1 .

(Y_1 comes from **VARS** → **YVARS**, #Function, Y_1)



```
LinReg(ax+b) L1,  
L2, Y1
```

You now have the values of a and b needed to write the equation of the actual **line of best fit**.

```
LinReg  
y=ax+b  
a=  
b=  
r=  
r=
```

4. Graph the line of best fit. Simply hit GRAPH.

To get a predicted value **within the window**, hit 2nd TRACE then 1 (Value) and type the desired value. The screen below shows $x = 22$.

5. Use the graphing calculator to draw a scatter plot of your ten points.

STAT

1. Edit

(Enter your x values in L₁, and y values in L₂.)

STAT PLOT (**2nd** **Y=**)

1. Plot 1

ENTER

ENTER (to turn on)

GRAPH

6. Use the graphing calculator to find a quadratic equation that approximates the scatter plot.

STAT

→ **CALC**

5. QuadReg

ENTER

Write your values for a, b, and c. Round them to the nearest hundredth.

Write the quadratic equation. ($y=ax^2+bx+c$)

7. Use the graphing calculator to graph the equation you just found.

Y= (type in your equation from step 6)

GRAPH

8. Describe how well the parabola approximates the scatter plot.

9.

Be sure BOTH you and your partner do this if working in a GROUP.