

Line of Best Fit Directions for the Graphing Calculator

One method for determining the line of best fit to a set of data is called the method of least squares. Your calculator is programmed to find the equation of this line which is called the **regression line** for the data. The steps for using your calculator to make a scatter plot, find the equation of the regression line for the data, and display its graph are given on the following pages.





To Enter the Data:

- To enter the data and find the regression equation, we use the STAT menu. Press **[STAT]**...and choose 1:Edit by pressing **[ENTER]**. Before entering the data into your calculator, you may need to clear the lists of previous data. Clear each list by pressing up arrow to highlight L_1 then press **[CLEAR][ENTER]**. Keep moving sideways to the next list that needs clearing.
- Type into L_1 the t values 0, 1, 3, 5, 7, and 11. After typing each number, press **[ENTER]**. Use the right arrow to move to L_2 and type in the data 10350, 11380, 10290, 11480, 12990 and 15030. Your calculator screen should look like

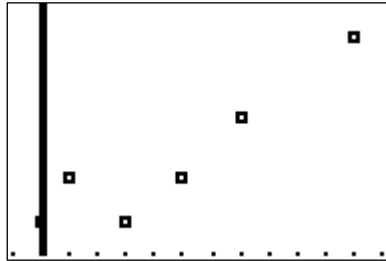
L1	L2	L3	2
0	10350	-----	
1	11380		
3	10290		
5	11480		
7	12990		
11	15030		
-----	-----		
L2(?) =			

To Graph the Scatter Plot for this Data:

- Press **[2nd][stat plot]** and choose Plot 1 by pressing **[ENTER]**. Press **[ENTER]** again to highlight On. Now you can select options for the plot. The options you want are shown in the screen below. If the options for Type or Mark are different from what you want, use the arrow keys to select the one you want and press **[ENTER]**. To change the Xlist or Ylist: down arrow to that item, press **[2nd]** and press the key for the number from 1 to 6 that represents the correct list.

Plot1	Plot2	Plot3
On	Off	
Type:		
Xlist:	L1	
Ylist:	L2	
Mark:		

- Now that we have the plot options set, we can graph the scatter plot, but first we should clear our Y= list. In the $\boxed{Y=}$ screen, clear or deselect any entered functions, then press \boxed{ZOOM} and choose 9: ZoomStat by pressing 9. This tells the calculator to choose a suitable window to display the scatter plot. Your calculator screen should look like this:



By pressing \boxed{TRACE} and using the left and right arrow keys, you can jump from data point to data point.

To Find the Equation of the Line of Best Fit (Regression Line) and See its Graph:

- From the home screen, press \boxed{STAT} then right arrow to $\boxed{[CALC]}$, choose 4: LinReg(ax+b) by pressing 4. To tell the calculator which lists contain the data, press $\boxed{2nd}$ and press the key for the number from 1 to 6 that represents the first list, press $\boxed{,}$ $\boxed{2nd}$ and press the key for the number from 1 to 6 that represents the second list.
- Now we need to tell the calculator to put the regression equation in Y_1 . Press $\boxed{,}$, press \boxed{VARS} , right arrow to Y-VARS, press \boxed{ENTER} to select 1:Function. Press \boxed{ENTER} to select Y_1 . Your screen should look like this

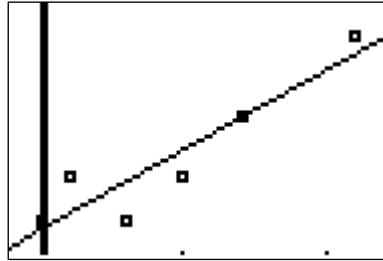
```
LinReg(ax+b) L1,
L2,Y1
```

- Press \boxed{ENTER} to get the regression equation. Your calculator screen should look like

```
LinReg
y=ax+b
a=408.0239521
b=10083.89222
```

Rounding to three decimal places, the equation of the line of best fit is $y = 408.024x + 10083.892$.

- To graph this line on the scatter plot: Press $\boxed{Y=}$ to see that the equation with all its decimal digits is there. Press $\boxed{\text{GRAPH}}$. Your calculator screen should look like



CALCULATOR NOTES

A Table is generated by typing a function into $\boxed{Y=}$. If you don't have a function typed in, you will not see any entries in the table.

Lists, however, are generated by typing in data points. Press $\boxed{\text{STAT}}$ and choose 1:Edit by pressing $\boxed{\text{ENTER}}$. If you get the error message **ERR:DIM MISMATCH**, it could mean that one list has more numbers in it than the other.

To get an even better window, you might change what $\boxed{\text{ZOOM}}$ 9 gave you. You might adjust the x and y parameters to be "nicer" numbers. Also, the $\boxed{\text{ZOOM}}$ 9 does not adjust the $xscl$ or $yscl$, leaving it at its prior setting. For instance, in the graph above, the $yscl$ is too small for this data, giving you a "thick" y -axis without visible tick marks. The $yscl$ should be changed to a larger value.