

# Linear Regression with the TI-84

## STEP 1: ENTER DATA

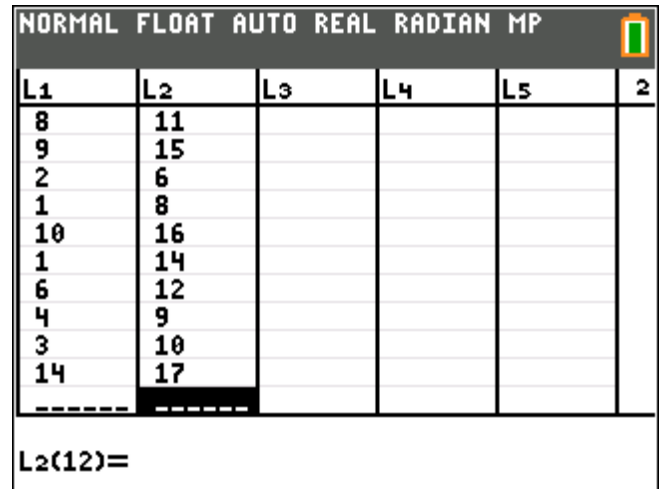
Press **[stat]**.

Choose **1. EDIT**

Type the data in two lists. It's a good idea to use **L<sub>1</sub>** for the x variable and **L<sub>2</sub>** for the y variable, as the calculator usually defaults to these.

Don't forget to press **[enter]** after typing in the last data value.

Is there already data entered in your calculator? To clear previous data, select the list title and press **[clear]**, **[enter]**.



The calculator screen displays the data entry interface for lists L1 and L2. The top status bar shows 'NORMAL FLOAT AUTO REAL RADIAN MP'. The list titles are L1, L2, L3, L4, L5, and 2. The data for L1 is 8, 9, 2, 1, 10, 1, 6, 4, 3, 14. The data for L2 is 11, 15, 6, 8, 16, 14, 12, 9, 10, 17. The cursor is at the bottom of the L2 list, and the text 'L2(12)= ' is visible.

L1	L2	L3	L4	L5	2
8	11				
9	15				
2	6				
1	8				
10	16				
1	14				
6	12				
4	9				
3	10				
14	17				

## STEP 2: PLOT A SCATTERPLOT

Press **[2nd]**, **[y=]** (stat plot). Then choose **Plot1**, **Plot2** or **Plot3**.

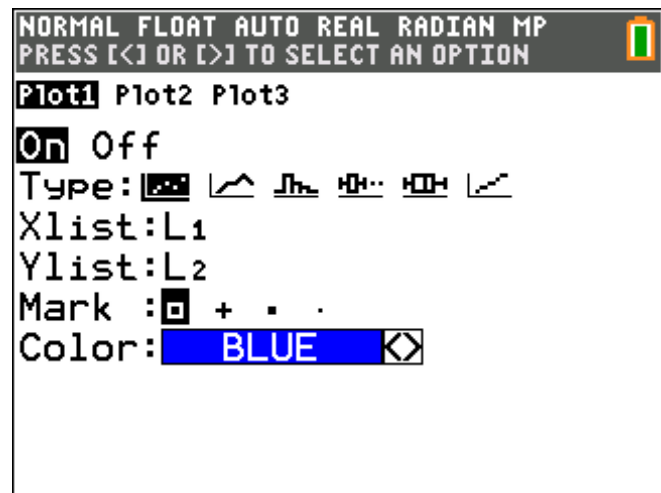
Set the plot to **On**.

**Type:** Scatterplot

**Xlist:** List with x values, usually **L<sub>1</sub>**.

**Ylist:** List with y values, usually **L<sub>2</sub>**.

**Mark:** Symbol used to indicate each point.



The calculator screen displays the plot settings for Plot1. The top status bar shows 'NORMAL FLOAT AUTO REAL RADIAN MP'. The plot title is Plot1, Plot2, Plot3. The plot is set to 'On'. The Type is Scatterplot. The Xlist is L1, the Ylist is L2, and the Mark is a square with a plus sign. The Color is BLUE.

Plot1	Plot2	Plot3
On	Off	Off
Type: Scatterplot		
Xlist: L1		
Ylist: L2		
Mark: Square with +		
Color: BLUE		

## STEP 3: SET UP THE WINDOW

Press **[zoom]**, select **9: ZoomStat**.

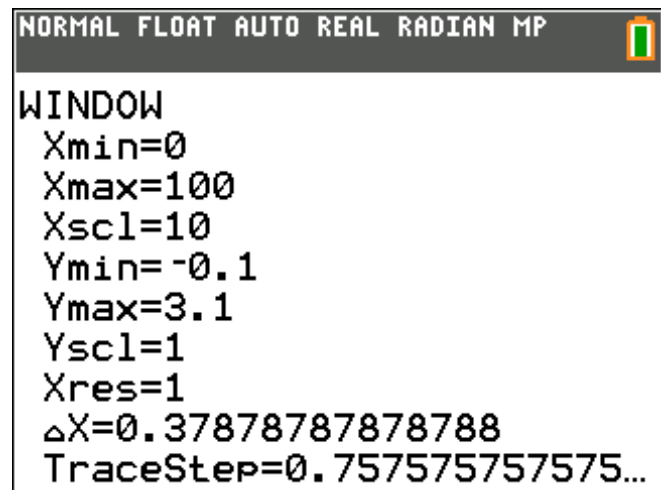
This is usually all you need to do, but if you want more manual control over the display, press **[window]**.

**Xmin** and **Xmax**: Smallest and largest values on the horizontal scale.

**Xscl**: Determines where the ticks occur on the horizontal scale.

**Ymin** and **Ymax**: Largest and smallest values on the vertical scale.

**Yscl**: Determines where the ticks occur on the vertical scale.



The calculator screen displays the window settings. The top status bar shows 'NORMAL FLOAT AUTO REAL RADIAN MP'. The window title is WINDOW. The settings are: Xmin=0, Xmax=100, Xscl=10, Ymin=-0.1, Ymax=3.1, Yscl=1, Xres=1, ΔX=0.37878787878788, and TraceStep=0.75757575757575...

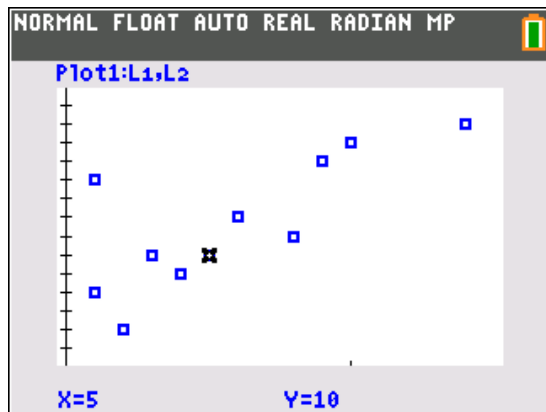
WINDOW
Xmin=0
Xmax=100
Xscl=10
Ymin=-0.1
Ymax=3.1
Yscl=1
Xres=1
ΔX=0.37878787878788
TraceStep=0.75757575757575...

#### STEP 4: VIEW THE SCATTERPLOT

Press **[graph]**.

Press **[trace]** and use the left and right arrows to view the coordinates of each point.

Note that the trace will go through the points in the order that they're entered in the list. If the data is not in numerical order, the trace point will appear to jump all over the screen.



#### STEP 5: PERFORM LINEAR REGRESSION

Press **[stat]**, go to **CALC**. Choose **4: LinReg(ax+b)**.

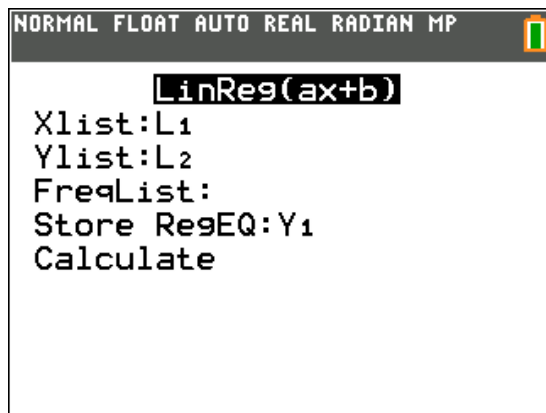
**Xlist:** List with x values, usually **L<sub>1</sub>**.

**Ylist:** List with y values, usually **L<sub>2</sub>**.

**FreqList:** Usually blank, or the list containing frequencies if needed.

**Store RegEQ:** Optionally choose a y-variable to store the resulting equation in. Very useful if you want to see the graph. Press **[alpha]**, **[trace]**(f4), then **1** to store in **Y<sub>1</sub>** (or whichever you want to use.)

Then choose **Calculate**.



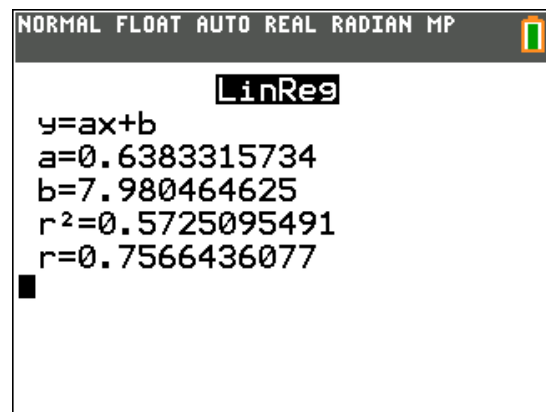
#### STEP 6: CALCULATE R and R<sup>2</sup>

These are shown when you calculate the regression equation, but are turned off by default. To enable them:

Press **[2nd]**, **[0]**(catalog).

Press **[x<sup>-1</sup>]**(D) to jump down the list.

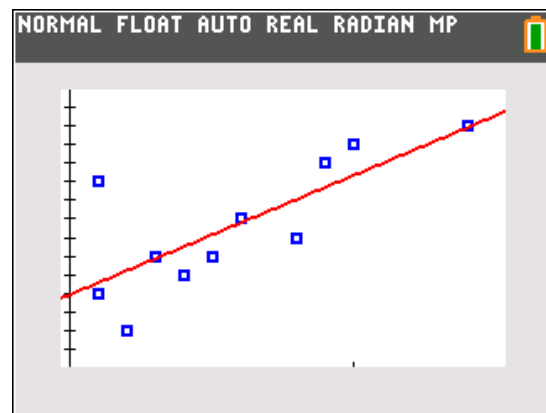
Select **DiagnosticOn** and press **[enter]** twice.



#### STEP 7: VIEW THE REGRESSION EQUATION GRAPH

If you chose a y-var for **Store RegEq** earlier, it's already stored. Press **[Y=]** if you want to see it, or possibly change its style or color.

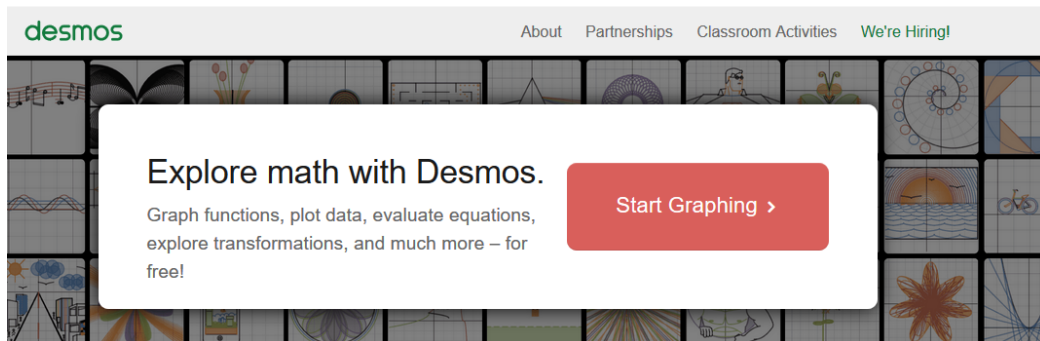
Otherwise, just press **[graph]**. If your scatterplot is still enabled, you will see both at the same time.



# Linear Regression with DESMOS

## STEP 1: OPEN DESMOS

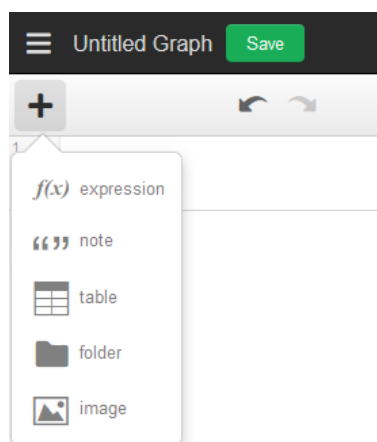
Visit [www.desmos.com](http://www.desmos.com)  
Select "Start Graphing"



## STEP 2: ENTER DATA

Click the plus sign in the upper left corner.  
Select "Table"

Type the data in the provided table.. Use  $x_1$  for the x variable and  $y_1$  for the y variable.



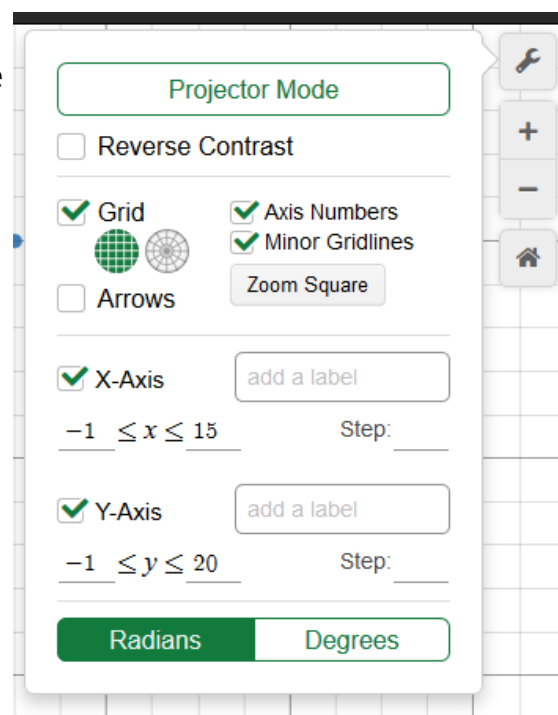
$x_1$	$y_1$
8	11
9	15
2	6
1	8
10	16
1	14
6	12
4	9
3	10
14	17

## STEP 3: SET UP THE WINDOW

Click the wrench icon in the upper right hand corner of the screen.

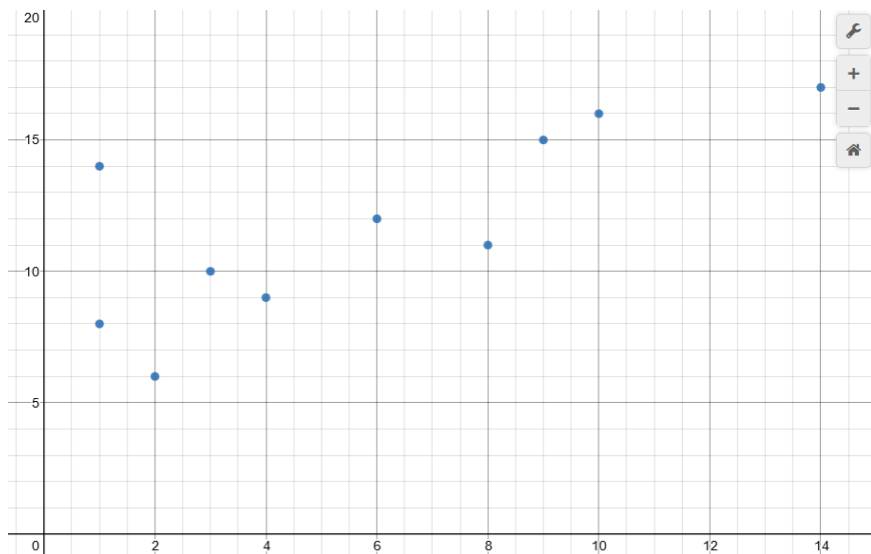
Under X-Axis, choose the smallest and largest values that you want to show on the horizontal axis. Determine these numbers by choosing numbers slightly smaller than and slightly larger than x-values in your table of data.

Under Y-Axis, choose the smallest and largest values that you want to show on the vertical axis. Determine these numbers by choosing numbers slightly smaller than and slightly larger than the y-values in your table of data.



### STEP 4: VIEW THE SCATTERPLOT

Once the window is set-up correctly, the scatterplot should now appear in the main Desmos screen. If all of the data points do not appear, adjust the window as necessary.



### STEP 5: PERFORM LINEAR REGRESSION

In the expression list (below the table), type a new line:

$$y_1 \sim mx_1 + b$$

R and  $R^2$  will automatically be calculated.

$y_1 \sim mx_1 + b$

STATISTICS	RESIDUALS
$r^2 = 0.5747$	$e_1$ <input type="button" value="plot"/>
$r = 0.7581$	

PARAMETERS	
$m = 0.632867$	$b = 8.12937$

### STEP 6: VIEW THE REGRESSION EQUATION GRAPH

