

Math-2A

Lesson 4-6

Linear Regression

4. Make sure your window will display all the x and y values in the data

x	-2	-1	0	1	2	3
y	10	6	5	6	10	19

```
WINDOW
Xmin=-5
Xmax=20
Xscl=1
Ymin=-5
Ymax=40
Yscl=1
Xres=1
```

Will this window contain all of the x-y pairs?

Set your “window” to

$$x(\text{min}) = -10$$

$$x(\text{max}) = 10$$

$$y(\text{min}) = -5$$

$$y(\text{max}) = 25$$

Is the data linear?

5. “Turn on” plot-1: (Plot-1 uses x values from L1 and y-values from L2)

→ Go to “y=” and make sure Plot1 is highlighted.

```
Plot1 Plot2 Plot3
Y1=2X
Y2=
Y3=
Y4=
Y5=
Y6=
Y7=
```

6. “Graph” your points and look at the shape

Is the data linear?

Is the following data linear?

x	1	5	9	13	17	21
y	-11	-13	-15	-17	-19	-21

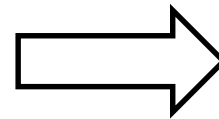
Convert the table of values above into a graph on the TI-84 calculator.

Is the data linear (do the points when graphed “line up”)?

Regression: the process of converting data (x-y pairs) into an equation.

Linear Regression: the process of converting linear data into a linear equation.

x	1	5	9	13	17	21
y	-11	-13	-15	-17	-19	-21



$$y = mx + b$$

Linear Regression on the TI-84 Calculator

After you have:

a) Entered the table into L1 and L2

x	1	5	9	13	17	21
y	-11	-13	-15	-17	-19	-21

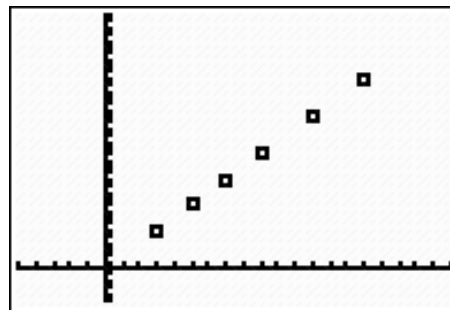
b) Made sure the window will display all of the (x, y) pairs

```
WINDOW
Xmin=-5
Xmax=20
Xscl=1
Ymin=-5
Ymax=40
Yscl=1
Xres=1
```

c) Turned on your Plot-1

```
Plot1 Plot2 Plot3
Y1=2X
Y2=
Y3=
Y4=
Y5=
Y6=
Y7=
```

d) And graphed the x-y pairs to make sure they are linear



1. "stat" p/b)

```
3:000 CALC TESTS
1:Edit...
2:SortA(
3:SortD(
4:ClrList
5:SetUPEditor
```

2. "calc" p/b and select "LinReg (ax + b)" (linear regression)

```
EDIT 3:000 TESTS
1:1-Var Stats
2:2-Var Stats
3:Med-Med
4:LinReg(ax+b)
5:QuadReg
6:CubicReg
7↓QuartReg
```

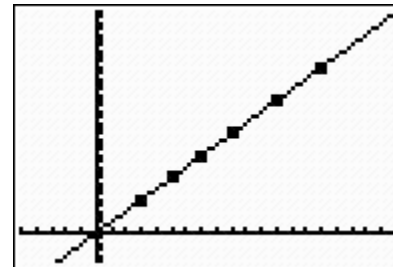
```
LinReg(ax+b)
```

3. If you put all the x-y pairs into L1 and L2, hit "enter" p/b; the calculator will give you the linear equation.

```
LinReg
y=ax+b
a=2
b=0
```

4. Enter this equation into your calculator

5. Graph your equation to make sure it passes through the points ("graph" p/b).



```
7:001 Plot2 Plot3
Y1=2X
Y2=
Y3=
Y4=
Y5=
Y6=
Y7=
```

Linear regression only requires two points (if the data is linear)

Is the following data linear?

x	1	5	9	13	17	21
y	-11	-13	-15	-17	-19	-21

Diagram illustrating the data points and their differences:

- Red arrows above the x-values show a constant difference of $+4$ between consecutive points.
- Red arrows below the y-values show a constant difference of -2 between consecutive points.

If the data is linear enter the following data into L1 and L2

L1	1	5				
L2	-11	-13				

Find the equation of the line using Linear Regression.

Linear regression is the nice way to find the equation of a line if the y-intercept is not given in the table.

x	-2	1	4
y	-12	3	18

x	-6	3	6
y	2	8	10

x	-10	5	10
y	15	3	-1

Find each equation
that fits the data.