Math 130

Sinusoidal Regression on TI-83

These instructions will help you
- Enter data
- Plot data points in a scatter plot
- Fit a sinusoidal function to those data and plot it to see how well it fits.

1. Preparing the STAT editor:

First steps: If you are plotting points for the first time or you haven't used the Statistics editor for a while, start here.

Turning ON the STAT PLOT:

Go to the STAT PLOT menu by pressing [2nd] [Y=] and then press [ENTER] with the cursor on 1:Plot 1 (1)

Turn on the STAT PLOT by pressing [ENTER] with the cursor on ON and highlight the Type and Mark as shown (2)

(1)   (2)

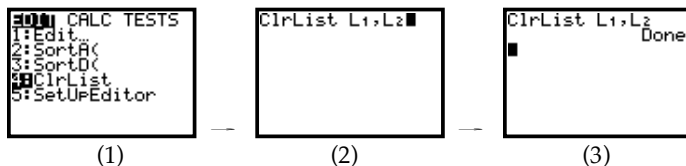Note the Xlist is L1 and the Ylist is L2

Clearing the STAT editor:

If there are data stored in the lists L! and L2, you will want to clear the lists.

To clear the statistics editor press the [STAT] button and then [4] (ClrList) (1)

Now type in [2nd] [1] to get L$_1$, then type a comma [,] and follow it with [2nd] [2] to get L$_2$, (etc.) (2)

then press [Enter] (3)

(1)   (2)   (3)

You can also clear individual lists by arrowing up to the top of the list (where the name is) pressing [Clear] and then pressing [Enter] .

2. Plotting Data

Begin by making sure that STAT PLOT 1 is ON (See above)

[Example:] Enter the table below in the statistics editor:

x	1	2	3	4	5	6	7	8	9	10
y	23.11	14.40	37.35	50. 68	30.41	13.00	29.76	50.55	37.97	14.65

To put data into the statistics editor: Press the [STAT] button and then [ENTER] with the cursor on EDIT (1)

Begin entering data by putting x values in L$_1$ and y values in L$_2$ (2)

Go to the [ZOOM] menu and press [9] (Zoom Stat) and the graph will follow. (3) & (4)

(1)   (2)   (3)   (4)
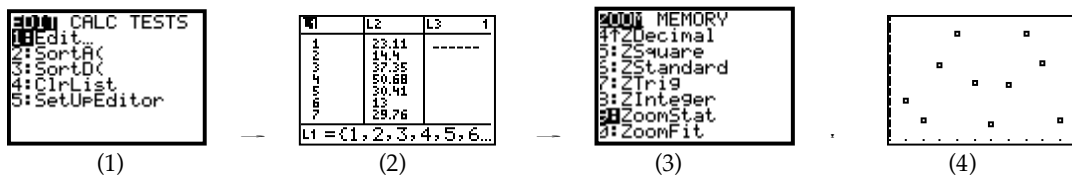
[Over:]

Generating a Sinusoidal curve to fit the data

Press the [STAT] button   (1)

Use the <u>Right Arrow</u> to move over to CALC, then <u>Down Arrow</u> to C:SinReg and press [ENTER]   (2) & (3)

```
EDIT CALC TESTS        EDIT CALC TESTS        SinReg ■
1:Edit…                 7↑QuartReg
2:SortA(                8:LinReg(a+bx)
3:SortD(                9:LnReg
4:ClrList               0:ExpReg
5:SetUpEditor           A:PwrReg
                        B:Logistic
                        C:SinReg
        (1)                    (2)                    (3)
```

In order to store the results in the y= editor, do the following:
With the cursor just to the right of the SinReg notice (see step (3) above),

Press the [VARS] button   (4)

<u>Right Arrow</u> over to Y-VARS and press [ENTER]   (5)

With the cursor on [Y1] press [ENTER] again   (6)
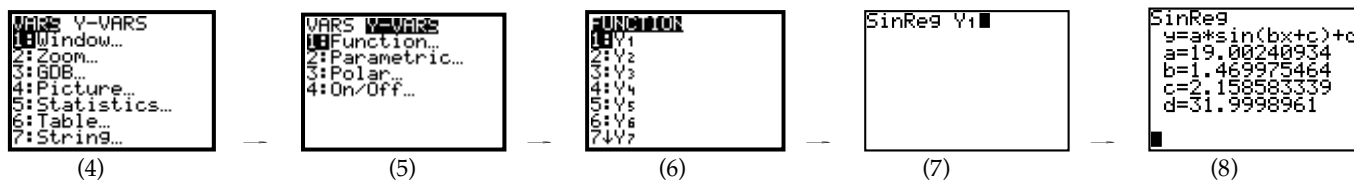
To execute the regression routine Press [ENTER]   (7)

The regression function will be displayed in the form y = a*sin(bx + c) + d **   (8)

```
VARS Y-VARS        VARS Y-VARS        FUNCTION        SinReg Y1■      SinReg
1:Window…          1:Function…        1:Y1                            y=a*sin(bx+c)+d
2:Zoom…            2:Parametric…      2:Y2                            a=19.00240934
3:GDB…             3:Polar…           3:Y3                            b=1.469975464
4:Picture…         4:On/Off…          4:Y4                            c=2.158583339
5:Statistics…                         5:Y5                            d=31.9998961
6:Table…                              6:Y6                            ■
7:String…                             7↓Y7
    (4)                (5)                (6)             (7)              (8)
```

To see that your equation matches the data, press the [GRAPH] button   (9)

```
                   Plot1 Plot2 Plot3
                   \Y1■9.002409336
                   763*sin(1.469975
                   4642237X+2.15858
                   3339497)+31.9998
                   9609881
                   \Y2=
                   \Y3=
     (9)               (10)
```

**The equation is stored in the [Y=] editor. Press [Y=] in order to see the function.   (10)

If you try to graph something later and you get the Error message below (1), you need to turn off the STAT PLOTS. In the Y= editor (2), go to the very top where Plot1 is highlighted (2) and press enter to turn it off (3).

```
ERR:INVALID DIM    Plot1 Plot2 Plot3    Plot1 Plot2 Plot3
1:Quit             \Y1=■                \Y1=■
                   \Y2=                 \Y2=
                   \Y3=                 \Y3=
                   \Y4=                 \Y4=
                   \Y5=                 \Y5=
                   \Y6=                 \Y6=
                   \Y7=                 \Y7=
        (1)                (2)                  (3)
```