Handout 7(a): Displaying and Managing Data on a TI-84

Entering Data into a TI-84

The purpose of this first section is to show you the steps in entering a table of numbers into a graphing calculator. It is a good idea for you to follow along with the instructions given here on your own calculator¹.

In this demonstration we will enter the values from Table 1 (below), using "year" as the input and "percentage" as the output².

Year	1975	1976	1977	1978	1979
Percentage	60.1	58.9	55.8	52.9	50.4

Table 1: Percentage of high school seniors who see "great risk" in trying heroin once or twice.

The steps involved in entering this data into a TI-84 are shown below.

	EDU CALC TESTS IEdit 2:SortA(3:SortD(4:ClrList 5:SetUPEditor	L1 L2 L3 1 1 2 2 1. 3 .3 4 1. 5	L1 L2 L3 1	L1 L2 L3 1
(a) After you turn your calculator on, you will see the MAIN SCREEN. Press [STAT].	(b) You should get a screen that looks like this. Press [ENTER].	(c) There may already be some data stored in the calculator. You will need to clear this. (See next section.)	(d) This is what your screen should look like when you have cleared all of the data.	(e) Make sure that the dark cursor is under L1 and type the first input value (1975).

L1 1975	L2 	<u></u>	L1 1975 1976 1977 1978 1979	L2 	<u>L3 1</u> 	L1 1975 1976 1977 1978 1979	L2		L1 1975 1976 1977 1978 1979 	L2	L3 2 	L1 1975 1976 1977 1978 1979	60.1	<u></u>
L1(2)=			L1(6)=			L2(1)=			L2(1)=6	0.1		L2(2) =		
(f) Pro enter t	ess [EN he input	TER] to t value.	(g) Ty put val pressin after ye each va	pe in ea ue in Ta Ig [ENT ou have alue.	ach in- able 1, `ER] typed	(h) Pr arrow lator so cursor	ess the s on your o that th is below	right calcu- ne dark w L2.	(i) Ty put va Table calcul	pe the f lue fron 1 into y ator.	irst out- n the our	(j) Pre enter t	ess [EN' he value	TER] to 2.

Continued on the next page.

¹ If you don't have a TI-84, then the procedures for entering and displaying data may be different. Consult the Owners' Manual for your calculator for the specific procedures to follow. ² The source of the data in Table 1 is: Johnston, L. D., P. M. O'Malley and J. G. Bachman. 2003. *Monitoring the Future National*

² The source of the data in Table 1 is: Johnston, L. D., P. M. O'Malley and J. G. Bachman. 2003. *Monitoring the Future National Survey Results on Drug Use*, *1975-2002. Volume I: Secondary School Students*. (NIH Publication number 03-5375.) Bethesda, MD: National Institute on Drug Abuse.

L1	L2	L3 2	
1975 1976 1977 1978 1979	60.1 58.9 55.8 52.9 50.4		
L2(6) =			
(k) Ty the out your ca king su press [ppe the r tput valuator alculator re that ENTER	rest of ues into or, ma- you &].	(l) To return to the MAIN SCREEN, press [2nd] [MODE] to quit data entry.

Clearing Data from Lists on a TI-84

If you want to enter and display new data on your calculator, you may find that there is some old data already there. Although it is possible to over-write the old data, it is usually best to clear the old data before entering the new³.

L1 L2 L3 1	1 L2 L3 1	🖬 L2 L3	1 L1 L2 L3 1	L1 📭 L3 2
 	·····	······	+	
L100=.2	L1 ={.2,1,2,3,4,.	L1 =	L1(1) =	L2 ={4,2,1,.3,1,
 (a) Begin by pressing [STAT] followed by [ENTER] to access the old data. 	(b) Press the up arrow on your calculator so that the cursor is over L1.	(c) Press the [CLEA key. The line at the very bottom of the screen will clear.	(d) Press the [ENTER] key. All of the data stored in L1 will be cleared.	(e) Press the right arrow followed by the up arrow so that the cursor is over L2.

L1	10	L3 2	L1	L2	L3 2		
	znumiun I						
L2 =			L2(1)=				
(f) Pres	s the [C	LEAR]	(g) Pres	ss the [H	ENTER]		

	2
key. The line at the	key. All of the data
very bottom of the	stored in L2 will be
screen will clear.	cleared.

³ If you try to make a graph or a STATPLOT on your calculator and the calculator produces a message that says: "ERROR: DIM MISMATCH" the reason is almost always because you have erroneously left some old data in the calculator.

Editing and Correcting your Data on a TI-84

Sometimes you might find that you have entered one of the data values incorrectly and you need to go back and correct it. The procedure for doing this on a TI-84 is shown below.

L1 1975 1976 1977 1978 1979	L2 58.9 5.58 52.9 50.4	<u></u>	L1 1975 1976 1977 1978 1979 	L2 58.9 58.9 52.9 50.4	<u></u>	L1 1975 1976 1977 1978 1979	L2 58.9 58.9 52.9 50.4		L1 1975 1976 1977 1978 1979	L2 58.9 55.8 55.8 50.4		•
L2(6) =			L2(3) = 3	5.58		L2(3) =	55.8∎		L2(4) =	52.9		
(a) The L2 has correctl	e third v been en y.	alue in tered in-	(b) Use to move over the value.	e the up e the cur e incorre	arrow rsor ect	(c) Typ value. 7 you typ appear a of the so	be the co The value will o at the bo creen.	orrect ue that nly ottom	(d) Pres to enter value in correct appear i	the corr the corr to L2. value w n L2 nc	ER] rect The ill ow.	(e) Press [2nd] followed by [MODE] to quite out of data entry and return to the MAIN SCREEN.

Setting up a STATPLOT on a TI-84

You can use your calculator to display a graph showing the numerical data that you have entered. On a TI-84 this kind of graph is called a STATPLOT and needs to be activated on the calculator.

Once you have entered the data, the steps involved in activating a STATPLOT are shown below.

	STAT_PLOTS 1:Plot10ff 2:Plot20ff 	and: Piot2 Piot3 Un Uiti Type: 53 ∟ dns 90 00 12 Xlist:L1 Ylist:L2 Mark: 5 + .	anta Piota Piota Of Off Type: an ∠ Ang More: L Xlist:L1 Ylist:L2 Mark: ■ •	•
(a) Begin at the MAIN SCREEN on your calculator.	 (b) Press the [2nd] key followed by the blue [Y=] key. This will bring you to the STAT PLOTS screen. 	(c) Press [ENTER] to select Plot 1.	(d) Using the left and right arrow keys, move the flashing cursor so that it is over the word 'On". Press [ENTER].	(e) Press [2nd] followed by [MODE] to quite out of STAT PLOTS and return to the MAIN SCREEN.

Displaying a STATPLOT on a TI-84

Once you have turned the STATPLOT on, you are ready to display the graph showing your data points on the screen of your calculator. If you simply press the [GRAPH] button on your calculator, you will probably by rewarded with a picture like the one shown on the next page.



which does not show any of the data points that you have entered. The problem here is that the size of the calculator's viewing window is not set to display values as large as the ones that you have entered.

The Viewing Window

If your calculator screen is blank with a pair of coordinate axes in the middle then you are looking at the TI-84's idea of a standard sized graphing window. Press the [WINDOW] button and your screen will resemble the one shown below.

	_
HINDOM .	
10 7 m 10	
XM1n=-10	
U	
AMAX=10	
Vec1=1	
0301-1	
l Vmin=−10	
ГҮмах=1И	
0	
YSCI=I	
Vecc-1	
VU62-1	

The correspondence between these numbers and the numbers that you would put on a set of coordinate axes if you were drawing a graph by hand is shown in the diagram below⁴.



⁴ The Xres and Yres settings are not very important for most of the graphs that we will make in Math 105, so we will ignore these settings during the course.

Modifying the Viewing Window

When you are displaying data (or graphing an equation later in the course) on a calculator it is best to set the viewing window so that you can see all of the relevant patterns and trends in the data.

For example, if you look at the numbers that are contained in Table 1:

Year	1975	1976	1977	1978	1979
Percentage	60.1	58.9	55.8	52.9	50.4

Table 1: Percentage of high school seniors who see "great risk" in trying heroin once or twice.

then the range of "inputs" or "x-values" that will display all of the points in Table 1 is from x = 1975 to x = 1979. The range of "outputs" or "y-values" that will display all of the points in Table 1 is y = 50.4 to y = 60.1. These ranges are very different from the standard ones assumed by the TI-84, which is why simply pressing the [GRAPH] button did not show any of the data points that had been entered into the calculator.

The steps involved in changing the size of the viewing window on a TI-84 are shown below. When you have completed them, press the [GRAPH] button with these new window settings and you should see a picture that resembles (e) below.

	WINDOW Xmin=-10 Xmax=10 Xscl=1 Ymin=-10 Ymax=10 Yscl=1 Xres=1	WINDOW Xmin=1975∎ Xmax=10 Xscl=1 Ymin=-10 Ymax=10 Yscl=1 Xres=1	WINDOW Xmin=1975 Xmax=1979 Xscl=1 Ymin=50.4 Ymax=60.1 Yscl=1 Xres=1	
(a) Start on your calculator's MAIN SCREEN.	(b) Press the [WINDOW] button.	(c) Type in the value that you want to use for Xmin and press [ENTER].	(d) Work your way down the list enter- the viewing window values that you want.	(e) When you have entered the values for the viewing window, press [GRAPH].

Automatic Window Set-Up for STATPLOTs: ZoomStat

If you are trying to display a STATPLOT but are not sure which values to use for Xmin, Xmax, Ymin and Ymax, then you can let the TI-84 make the decision for you.

Instead of entering the values for the viewing window, press the [ZOOM] button and use the arrow keys to move down to option 9 ("ZoomStat") then the calculator will take a look at your data and set up a decent-sized window for you. The steps involved and results of using ZoomStat with the data from Table 1 are shown on the next page.

	2000 MEMORY 1828ox 2:20om In 3:20om Out 4:2Decimal 5:2S9uare 6:2Standard 7↓2Tri9	2001 MEMORY 472Decimal 5:2Square 6:2Standard 7:2Tri9 8:2Integer 8:2Integer 9:2comStat 9:2comFit	· · · · · · · · · ·	WINDOW Xmin=1974.6 Xmax=1979.4 Xscl=1 Ymin=48.751 Ymax=61.749 Yscl=10 Xres=1
(a) Start on your calculator's MAIN SCREEN.	(b) Press the [ZOOM] button.	(c) Use the down arrow button to move down to option 9. Press [ENTER].	(d) The calculator will automatically switch the the graph and display the data.	(e) If you now press the [WINDOW] but- ton, you can see the window settings.

Turning Off a STATPLOT on a TI-84

When you have finished looking at a STATPLOT on a TI-84, you may want to remove it from the screen so that you can graph other sets of data or produce graphs from formulas. The steps involved in turning off a STATPLOT are shown below.

	STATE PLOTE 1.Plot10n 2.Plot20ff 1	2022 Plot2 Plot3 07 Off Type:2020 ∠ dbg wew work ∠ Xlist:L1 Vlist:L2 Mark: ■ + ·	ana: Piot2 Piot3 On Uiti Type: Iss ∠ Ans et Hor ∠ Xlist:L1 Ylist:L2 Mark: I + ·	
(a) Start on your calculator's MAIN SCREEN.	(b) Press [2nd] followed by [Y=] to access the STAT PLOTS screen.	(c) Press [ENTER] to access Plot 1.	(d) Use the right arrow to move the flashing cursor so that it covers "Off". Press [ENTER].	(e) Press [2nd] followed by [MODE] to return to the MAIN SCREEN.

Example: Creating a Formula for a Quadratic Function by Quadratic Regression

Table 1 (below) shows the average annual earnings of full-time, college-educated female workers in 1997⁵.

Age	18	25	35	45	55
Annual	26297	37321	46154	45105	40203
Earnings (\$)					

Table 1: Average annual earnings of full-time, college-educated female workers in 1997.

How could the TI-84 calculator be used to find an equation to approximate the relationship between age and earnings?

A good place to begin is with a STATPLOT showing the overall trend in the data. Often, a graph will show a recognizable pattern that suggests that a particular kind of formula will do a good job of representing the overall trend in the data.

⁵ Source: US Bureau of the Census, *Current Population Reports*.

Entering the data from Table 1 into a TI-84 and activating a STATPLOT gives the graph shown below.



This plot shows that as the average age of the female workers increases, the average salary rises, but that as the average age of the female workers reaches the mid to late 30's, the salary reaches a peak after which it declines. This pattern is typical of a quadratic function, so a quadratic function will probably do a reasonable job of representing the relationship.

The steps for finding the formula for the quadratic function that does the "best" job of matching the data from Table 1 on a TI-84 calculator are shown below.



With all of the coefficients rounded to two decimal places (for neatness – when you are doing calculations you should use all of the decimal places that your calculator provides), the quadratic formula that does the best job of matching the values contained in Table 1 is:

 $y = -37.47 \cdot x^2 + 3089.14 \cdot x - 16817.16,$

where *x* is the age and *y* is the annual salary.