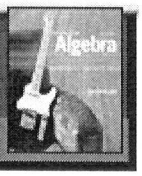

Appendix B Using a TI-83 or TI-84 Graphing Calculator

Appendix B

Using a TI-83 or TI-84 Graphing Calculator

The more you experiment with a graphing calculator, the more comfortable and efficient you will become with it.

A TI graphing calculator can detect several types of errors and display an error message. When this occurs, refer to Section B.26 for explanations of some common error messages and how to fix these types of mistakes. Errors do not hurt the calculator. In fact, you can't hurt the calculator regardless of the order in which you press its keys. So, the more you experiment with the calculator, the better off you will be.

To access a TI-83 command written in yellow above a key, first press [2nd], then the key. Whenever a key must follow the [2nd] key, this appendix will use brackets for the key. For example, "Press [2nd] [OFF]" means to press [2nd] and then press [ON] (because "OFF" is written in yellow above the [ON] key). The same applies for TI-84 commands written in blue above a key.

Aside from having different-colored keys, the TI-83 and TI-84 are similar calculators: Virtually all of the key combinations for a TI-83 and a TI-84 are the same.

Instructions for using a TI-85 and a TI-86 (as well as a TI-82 and a TI-83) graphing calculator are available at the website www.prenhall.com/divisions/esm/app/calc_v2/. This site also can serve as a cross-reference for TI-83 graphing calculator instructions. Since the TI-83 and TI-84 are so similar, TI-84 users will find the site helpful even though the TI-84 is not mentioned.

B.1 TURNING A GRAPHING CALCULATOR ON OR OFF

To turn a graphing calculator on, press [ON]. To turn it off, first press [2nd]. Then press [OFF].

B.2 MAKING THE SCREEN LIGHTER OR DARKER

To make the screen darker, first press [2nd] (then release it); then hold the [△] key down for a while. To make the screen lighter, first press [2nd] (then release it); then hold the [▽] key down for a while.

B.3 ENTERING AN EQUATION

To enter the equation $y = 2x + 1$,

1. Press [Y=].
2. If necessary, press [CLEAR] to erase a previously entered equation.

When we show two or more buttons in a row, press them one at a time and in order.

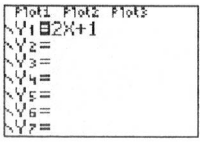

Figure 1 Entering an equation

3. Press **2** X,T,Θ,*n* + **1**. The screen will look like the one displayed in Fig. 1.
4. If you want to enter another equation, press ENTER. Then type in the next equation.
5. Use the △ or ▽ key to get from one equation to another.

B.4 GRAPHING AN EQUATION

To graph the equation $y = 2x + 1$,

1. Enter the equation $y = 2x + 1$; see Section B.3.
2. Press ZOOM **6** to draw a graph of your equation between the values of -10 and 10 for both x and y.
3. See Section B.6 if you want to zoom in or zoom out to get another part of the graph to appear on the calculator screen. Or see Section B.7 to change the window format manually; then press GRAPH.

B.5 TRACING A CURVE WITHOUT A SCATTERGRAM

To *trace a curve,* we find coordinates of points on the curve. To trace the line $y = 2x + 1$,

1. Graph $y = 2x + 1$ (see Section B.4).
2. Press TRACE.
3. If you see a flashing "×" on the curve, the coordinates of that point will be listed at the bottom of the screen. If you don't see the flashing "×," press ENTER, and your calculator will adjust the viewing window so that you can see it.
4. To find coordinates of points on your curve that are off to the right, press ▷.
5. To find coordinates of points on your curve that are off to the left, press ◁.
6. Find the y-coordinate of a point by entering the x-coordinate. For example, to find the y-coordinate of the point that has x-coordinate 3, press **3** ENTER. The screen will look like the one displayed in Fig. 2. This feature works for values of x between Xmin and Xmax, inclusive (see Section B.7).
7. If more than one equation has been graphed, press ▽ to trace the second equation. Continue pressing ▽ to trace the third equation, and so on. Press △ to return to the previous equation. Notice that the equation of the curve being traced is listed in the upper left corner of the screen.

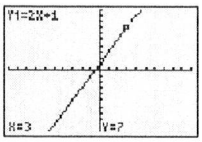

Figure 2 Tracing a curve

B.6 ZOOMING

The ZOOM menu has several features that allow you to adjust the viewing window. Some of the features adjust the values of x that are used in tracing.

- **Zoom In** magnifies the graph around the cursor location. The following instructions are for zooming in on the graph of $y = 2x + 1$:
  1. Graph $y = 2x + 1$ (see Section B.4).
  2. Press ZOOM **2**.
  3. Use ◁, ▷, △, and ▽ to position the cursor on the portion of the line that you want to zoom in on.
  4. To zoom in, press ENTER.

If you lose sight of the line, you can always press TRACE ENTER.

When zooming out, you will return to the original graph only if you did not move the cursor while zooming in.

5. To zoom in on the graph again, you have two options:
   a. To zoom in at the same point, press ENTER.
   b. To zoom in at a new point, move the cursor to the new point; then press ENTER.
6. To return to your original graph, press ZOOM **6**. Or zoom out (see the next instruction) the same number of times you zoomed in.

- **Zoom Out** does the reverse of Zoom In: It allows you to see *more* of a graph. To zoom out, follow the preceding instructions, but press ZOOM **3** instead of ZOOM **2** in step 2.
- **ZStandard** will change your viewing screen so that both x and y will go from -10 to 10. To use ZStandard, press ZOOM **6**.
- **ZDecimal** lets you trace a curve by using the numbers $0, \pm 0.1, \pm 0.2, \pm 0.3, \ldots$ for x. ZDecimal will change your viewing screen so that x will go from -4.7 to 4.7 and y will go from -3.1 to 3.1. To use ZDecimal, press ZOOM **4**.
- **ZInteger** allows you to trace a curve by using the numbers $0, \pm 1, \pm 2, \pm 3, \ldots$ for x. ZInteger can be used for any viewing window, although it will change the view slightly. To use ZInteger, press ZOOM **8** ENTER.
- **ZSquare** will change your viewing window so that the spacing of the tick marks on the x-axis is the same as that on the y-axis. To use ZSquare, press ZOOM **5**.
- **ZoomStat** will change your viewing window so that you can see a scattergram of points that you have entered in the statistics editor. To use ZoomStat, press ZOOM **9**.
- **ZoomFit** will adjust the dimensions of the y-axis to display as much of a curve as possible. The dimensions of the x-axis will remain unchanged. To use ZoomFit, press ZOOM **0**.

B.7 SETTING THE WINDOW FORMAT

To graph the equation $y = 2x + 1$ between the values of -2 and 3 for x and between the values of -5 and 7 for y,

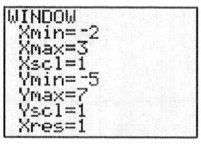

Figure 3 Window settings

1. Enter the equation $y = 2x + 1$ (see Section B.3).
2. Press WINDOW. Then change the window settings so that the window looks like the one displayed in Fig. 3 after you have used steps 3–8.
3. Press (-) **2** ENTER to set the smallest value of x to -2.
4. Press **3** ENTER to set the largest value of x to 3.
5. Press **1** ENTER to set the scaling for the x-axis to increments of 1.
6. Press (-) **5** ENTER to set the smallest value of y to -5.
7. Press **7** ENTER to set the largest value of y to 7.
8. Press **1** ENTER to set the scaling for the y-axis to increments of 1.
9. Press GRAPH to view the graph of $y = 2x + 1$. The screen will look like the graph drawn in Fig. 4.

If you press ZOOM **6** or ZOOM **9** or zoom in or zoom out, your window settings will change accordingly.

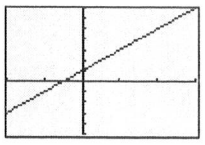

Figure 4 Graph of $y = 2x + 1$

Table 1 Creating a Scattergram

x	y
2	4
3	7
4	10
5	11

Make sure that you press CLEAR rather than DEL. If you press DEL, the column will vanish. If you ever do this by mistake, press STAT 5 ENTER to get back the missing column.

B.8 PLOTTING POINTS IN A SCATTERGRAM

To create a scattergram of the data displayed in Table 1,

1. To enter the data, press STAT 1.
2. If there are numbers listed in the first column (list L_1), clear the column by pressing ◁ as many times as necessary to get to column L_1. Next, press △ once to get to the top of column L_1. Then press CLEAR ENTER.
3. If there are numbers listed in the second column (list L_2), clear the column by pressing ▷ to move the cursor to column L_2. Then press △ CLEAR ENTER.
4. To return to the first entry position of list L_1, press ◁.
5. Press 2 ENTER 3 ENTER 4 ENTER 5 ENTER to enter the data in column L_1. (If you make a mistake, you can delete an entry by pressing DEL; then insert an entry by pressing 2nd [DEL].)
6. Press ▷ to move to the first entry position of list L_2.
7. Press 4 ENTER 7 ENTER 10 ENTER 11 ENTER to enter the elements of L_2.
8. Press 2nd [STAT PLOT].
9. Press 1 to select Plot 1.
10. Press ENTER to turn Plot 1 on.
11. Press ▽ ENTER to choose the scattergram mode.
12. Press ▽ so that the cursor is at "Xlist." Then press 2nd [L_1].
13. Press ▽ so that the cursor is at "Ylist." Then press 2nd [L_2].
14. Use squares, plus signs, or dots to represent the points plotted on the scattergram. These three symbols are called "Marks." Press ▽ once so that the cursor is on one of the three Mark symbols. Next, press ▷ and/or ◁ to select a symbol. Then press ENTER. The screen will look like the one displayed in Fig. 5.
15. Press ZOOM 9. The screen will look like the one displayed in Fig. 6.

If Plot 1 is off, your points will be saved in columns L_1 and L_2, but they will not be plotted.

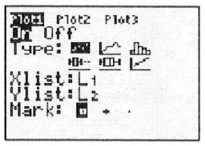

Figure 5 Setting up Plot 1

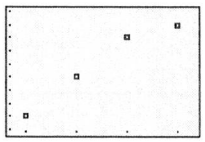

Figure 6 Creating a scattergram

B.9 TRACING A SCATTERGRAM

To see the coordinates of a point in a scattergram,

1. Draw a scattergram (see Section B.8).
2. Press TRACE.
3. Notice the flashing "×" on one of the points of the scattergram. The coordinates of this point are listed at the bottom of the screen.
4. To find the coordinates of the next point to the right, press ▷.
5. To find the coordinates of the next point to the left, press ◁.

Table 2 Creating a Scattergram

x	y
2	4
3	7
4	10
5	11

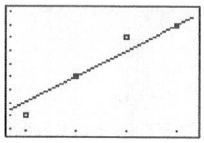

Figure 7 Graphing an equation and a scattergram

Recall from Section B.5 that if you do not see the flashing "×," press ENTER, and the calculator will adjust the viewing window so that you can see it.

B.10 GRAPHING EQUATIONS WITH A SCATTERGRAM

To graph the equation $y = 2x + 1$ with a scattergram of the data displayed in Table 2,

1. Enter the equation $y = 2x + 1$ (see Section B.3).
2. Follow the instructions in Section B.8 to draw the scattergram. (The graph of the equation will also be drawn, because you turned the equation on.) The screen will look like the one displayed in Fig. 7.

B.11 TRACING A CURVE WITH A SCATTERGRAM

To trace a curve with a scattergram,

1. Graph an equation with a scattergram (see Section B.10).
2. Press TRACE to trace points that make up the scattergram. Press TRACE ▽ to trace points that lie on the curve. If other equations are graphed, continue pressing ▽ to trace the second equation, and so on. Press △ to begin to return to the scattergram. Notice that the label "P1:L_1, L_2" is in the upper left corner of the screen when Plot 1's points are being traced and that the equation entered in the Y= mode is listed in the upper left corner of the screen when the curve is being traced.

B.12 TURNING A PLOTTER ON OR OFF

To change the on/off status of the plotter,

1. Press Y=.
2. Press △. A flashing rectangle will be on "Plot 1."
3. Press ▷ if necessary to move the flashing rectangle to the plotter you wish to turn on or off.
4. Press ENTER to turn your plotter on or off. The plotter is on if the plotter icon is highlighted.

B.13 CREATING A TABLE

To create a table of ordered pairs for the equation $y = 2x + 1$, where the values of x are 3, 4, 5, ... (see Fig. 8),

1. Enter the equation $y = 2x + 1$ for Y_1 (see Section B.3).
2. Press 2nd [TBLSET].
3. Press **3** ENTER to tell the calculator that the first x value in your table is 3.
4. Press **1** ENTER to tell the calculator that the x values in your table increase by 1.
5. Press ENTER ▽ ENTER to highlight "Auto" for both "Indpnt" and "Depend." The screen will now look like the one displayed in Fig. 9.
6. Press 2nd [TABLE] to create the table shown in Fig. 8.

X	Y1
3	7
4	9
5	11
6	13
7	15
8	17
9	19

X=3

Figure 8 Table of ordered pairs for $y = 2x + 1$

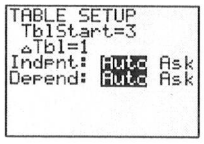

Figure 9 Table setup

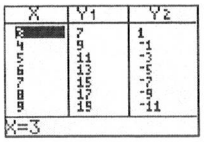

Figure 10 Table for two equations

B.14 CREATING A TABLE FOR TWO EQUATIONS

To create a table of ordered pairs for the equations $y = 2x + 1$ and $y = -2x + 7$, where the values of x are 3, 4, 5, ... (see Fig. 10),

1. Enter the equation $y = 2x + 1$ for Y_1, and enter the equation $y = -2x + 7$ for Y_2 (see Section B.3).
2. Follow steps 2–5 of Section B.13.

B.15 USING "ASK" IN A TABLE

Table 3 Using "Ask" in a Table with $y = 2x + 1$

x	y
2	
2.9	
5.354	
7	
100	

To use the Ask option in the Table Setup mode to complete Table 3 for $y = 2x + 1$,

1. Enter the equation $y = 2x + 1$ for Y_1 (see Section B.3).
2. Press 2nd [TBLSET].
3. Press ENTER twice. Next, press ▷. Then press ENTER. The Ask option for "Indpnt" will now be highlighted. Make sure that the Auto option for "Depend" is highlighted.
4. Press 2nd [TABLE].
5. Press **2** ENTER **2.9** ENTER **5.354** ENTER **7** ENTER **100** ENTER. The screen will now look like the one displayed in Fig. 11.

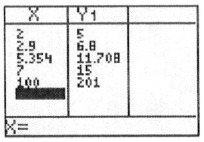

Figure 11 Using "Ask" for a table with $y = 2x + 1$

B.16 FINDING THE REGRESSION CURVE FOR SOME DATA

Table 4 Finding the Regression Line for Data

x	y
2	4
3	7
4	10
5	11

To find the regression line for the data displayed in Table 4,

1. See Section B.8 to create a scattergram of the data in Table 4. Enter your data in the first two columns (L_1 and L_2) of the STAT list editor.
2. Clear the Home Screen by pressing 2nd [QUIT] CLEAR.
3. Press STAT.
4. To choose the CALC menu, press ▷. The screen should look like the one displayed in Fig. 12.
5. To choose Linear Regression, press **4**. The screen should now look like the one displayed in Fig. 13. (You can choose Quadratic Regression by pressing **5**, Exponential Regression by pressing **0**, or Power Regression by pressing ALPHA [A].)

You can perform regression on columns other than L_1 and L_2 by listing the two columns, separated by a comma, after the "LinReg(ax+b)" command on the Home screen. For example, "LinReg(ax+b) L_4, L_6" will perform a linear regression on columns 4 and 6 of the STAT list editor.

Figure 12 CALC menu

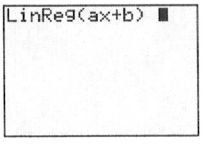

Figure 13 About to find the equation

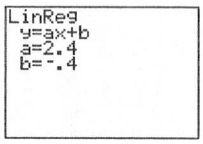

Figure 14 The equation

6. Press ENTER. The screen should now look like the one displayed in Fig. 14. This means that the equation of the regression line is $y = 2.4x - 0.4$.

To draw a graph of the regression line, you may either enter the equation manually (see Section B.3) or use the command

$$\text{LinReg(ax+b) } L_1,L_2,Y_1$$

which saves the equation to Y_1. Here are the keystrokes:

1. Follow the earlier instructions to get "LinReg(ax+b)" on your screen.
2. Press 2nd [L_1] , 2nd [L_2] ,.
3. Press VARS ▷ 1 ENTER. The screen should look like the one displayed in Fig. 15.
4. Press ENTER. The screen should now look like the one displayed in Fig. 14. In addition, if you press Y=, the screen will look like the one displayed in Fig. 16.

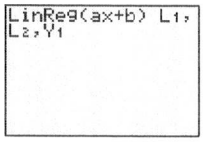

Figure 15 About to save the equation to Y_1

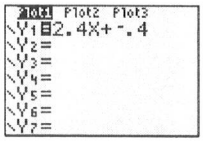

Figure 16 The equation is saved in Y_1

B.17 PLOTTING POINTS IN TWO SCATTERGRAMS

It is possible to draw two scattergrams on the same calculator screen and use different markings for the two sets of points. To begin, follow the instructions in Section B.8 to create a scattergram of the data values in Table 5.

Table 5 Creating the First of Two Scattergrams

x	y
2	4
3	7
4	10
5	11

These data are stored in columns L_1 and L_2. The points are plotted by the plotter called "Plot 1."

You will now create a scattergram of the data values in Table 6.

These data will be stored in columns L_3 and L_4. The points will be plotted by the plotter called "Plot 2." To do this,

1. To enter the data, press STAT 1.
2. To clear list L_3, press ▷ and/or ◁ to move the cursor to column L_3. Then press △ CLEAR ENTER.
3. To clear list L_4, press ▷ to move the cursor to column L_4. Then press △ CLEAR ENTER.
4. To return to the first entry position of list L_3, press ◁.
5. Press 2 ENTER 2 ENTER 3 ENTER 5 ENTER to enter the elements of L_3.
6. Press ▷ to move to the first entry position of list L_4.
7. Press 11 ENTER 9 ENTER 6 ENTER 4 ENTER to enter the elements of L_4.
8. Press 2nd [STAT PLOT].
9. Press 2 to select "Plot 2."
10. Press ENTER to turn Plot 2 on.
11. Press ▽ twice so that the cursor is at "Xlist." Then press 2nd [L_3].
12. Press ENTER so that the cursor is at "Ylist." Then press 2nd [L_4].

Make sure that you press CLEAR rather than DEL. If you press DEL, the column will vanish. If you ever do this by mistake, press STAT 5 ENTER to get back the missing column.

Table 6 Creating the Second of Two Scattergrams

x	y
2	11
2	9
3	6
5	4

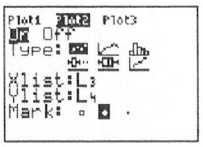

Figure 17 Setting up Plot 2

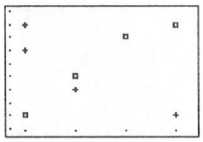

Figure 18 Creating two scattergrams

13. Press ▽ once so that the cursor is on one of the three choices for "Mark." Next, press ▷ and/or ◁ to select a symbol different from the one you used for the first scattergram. Then press ENTER. The screen will look like the one in Fig. 17.
14. Press ZOOM **9** to obtain the two scattergrams with different symbols. The screen will look like the one displayed in Fig. 18.

B.18 FINDING THE INTERSECTION POINT(S) OF TWO CURVES

To find the intersection point of the lines $y = 2x + 1$ and $y = -2x + 7$,

1. Enter the equation $y = 2x + 1$ for Y_1, and enter the equation $y = -2x + 7$ for Y_2 (see Section B.3).
2. By zooming in or out or by changing the window settings, draw a graph of both curves so that you can see an intersection point. For our example, press ZOOM **6**.
3. Press 2nd [CALC]. The screen will look like the one displayed in Fig. 19.
4. Press **5** to select "intersect."
5. You will now see a flashing cursor on your first curve. If there is more than one intersection point on your display screen, move the cursor by pressing ▷ or ◁ so that it is much closer to the intersection point you want to find. The screen will look something like the one displayed in Fig. 20.
6. Press ENTER to put the cursor on the second curve. Press ENTER again to display "Guess?" Press ENTER once more. The screen will look like the one displayed in Fig. 21. The intersection point is (1.5, 4).

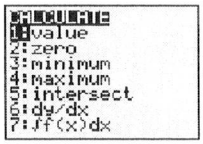

Figure 19 Menu of choices

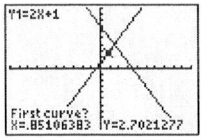

Figure 20 Put cursor near intersection point

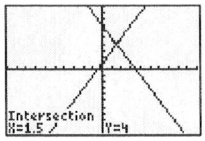

Figure 21 Location of intersection point

B.19 FINDING THE MINIMUM POINT(S) OR MAXIMUM POINT(S) OF A CURVE

To find the minimum point of the curve $y = x^2 - 3x + 1$,

1. Enter the equation $y = x^2 - 3x + 1$ (see Section B.3).
2. Use ZDecimal to draw a graph of the equation (see Section B.6).
3. Press 2nd [CALC].
4. Press **3** to select "minimum."
5. Move the flashing cursor by pressing ◁ or ▷ so that it is to the left of the minimum point, and press ENTER.
6. Move the flashing cursor by pressing ◁ or ▷ so that it is to the right of the minimum point, and press ENTER.
7. Press ENTER. The calculator will display the coordinates of the minimum point—about (1.50, −1.25). See Fig. 22.

You can find the maximum point of a curve in a similar fashion, but press **4** to select the "maximum" option, rather than the "minimum" option, in step 4.

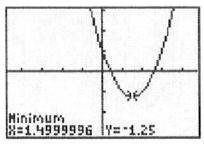

Figure 22 Finding the minimum point of $y = x^2 - 3x + 1$

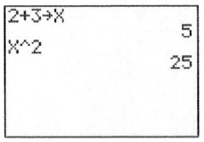

Figure 23 Computing $(2+3)^2 = 25$

B.20 STORING A VALUE

It is possible to store a number as x and then perform operations with x. For example, to find $(2+3)^2$,

1. Press **2** [+] **3** [STO▷] [X,T,Θ,*n*] [ENTER].
2. Press [X,T,Θ,*n*] [^] **2** [ENTER]. The screen should now look like the one displayed in Fig. 23.

B.21 FINDING ANY *x*-INTERCEPTS OF A CURVE

To find the x-intercept of the line $y = x - 2$,

1. Enter the equation $y = x - 2$ (see Section B.3).
2. Use ZDecimal to draw a graph of the equation (see Section B.6).
3. Press [2nd] [CALC].
4. Press **2** to choose the "zero" option.
5. Move the flashing cursor by pressing [◁] or [▷] so that it is to the left of the x-intercept, and press [ENTER]. Or type a number between Xmin and the x-coordinate of the x-intercept, and press [ENTER].
6. Move the flashing cursor by pressing [◁] or [▷] so that it is to the right of the x-intercept, and press [ENTER]. Or type a number between the x-coordinate of the x-intercept and Xmax, and press [ENTER].
7. Press [ENTER]. The screen will look like the one displayed in Fig. 24. The x-intercept is (2, 0).

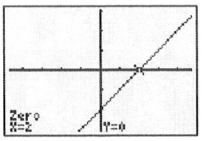

Figure 24 Finding the x-intercept of $y = x - 2$

B.22 TURNING AN EQUATION ON OR OFF

You can graph an equation only if its equals sign is highlighted. (The equation is then "on.") Up to 10 equations can be graphed at one time. To change the on–off status of an equation,

1. Press [Y=].
2. Move the cursor to the equation whose status you want to change.
3. Use [◁] to place the cursor over the "=" sign of the equation.
4. Press [ENTER] to change the status.

B.23 FINDING COORDINATES OF POINTS

To find the coordinates of particular points,

1. Press [GRAPH] to get into graphing mode.
2. Press [▷] to get a cursor to appear on the screen. [If you cannot see the cursor, it is probably on one or both of the axes. If it is on an axis, you should still be able to see a small flashing dot.] Notice that the coordinates of the point where the cursor is currently positioned are at the bottom of the screen.
3. Use [◁], [▷], [△], or [▽] to move the cursor left, right, up, or down, respectively.

B.24 GRAPHING EQUATIONS WITH AXES "TURNED OFF"

Suppose that you want to draw a graph of $y = 0$. The axes will obscure the graph of $y = 0$. To graph without the axes appearing on the screen,

1. Enter the equation $y = 0$ for Y_1 (see Section B.3).
2. Press [2nd] [FORMAT]. You are now at the FORMAT menu.
3. Press [▽] three times, then press [▷]; then press [ENTER]. "AxesOff" should now be highlighted.
4. Use ZDecimal to have the screen appear like the one displayed in Fig. 25 (see Section B.6).

   You can turn the axes back on by highlighting "AxesOn" in the FORMAT menu.

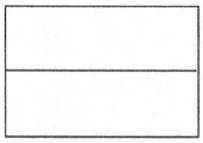

Figure 25 Graph of $y = 0$ with axes "turned off"

B.25 ENTERING AN EQUATION BY USING Y_n REFERENCES

To enter the complicated equation $y = \dfrac{x+1}{x-3} \div \dfrac{x-2}{x+5}$ by using Y_n references,

1. Enter $Y_1 = \dfrac{x+1}{x-3}$ and $Y_2 = \dfrac{x-2}{x+5}$ (see Section B.3).
2. Turn both equations off (see Section B.22).
3. Move the flashing cursor to the right of "$Y_3 =$."
4. Press [VARS] [▷] [ENTER].
5. Move the cursor to "1:Y_1" and press [ENTER]. "Y_1" will now appear to the right of "$Y_3 =$" in the [Y=] window.
6. Press [÷].
7. Press [VARS] [▷] [ENTER].
8. Move the cursor to "2:Y_2" and press [ENTER]. "Y_1 / Y_2" will now appear to the right of "$Y_3 =$" in the [Y=] window.

B.26 RESPONDING TO ERROR MESSAGES

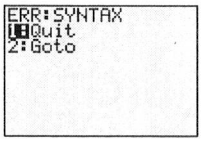

Figure 26 "Syntax" error message

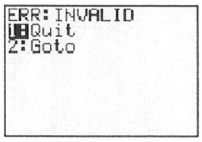

Figure 27 "Invalid" error message

Here are several common error messages and how to respond to them:

- The **Syntax** error (see Fig. 26) means that you have misplaced one or more parentheses, operations, or commas. The calculator will find this type of error if you choose "Goto" by pressing [▽], then [ENTER]. Your error will be highlighted by a flashing black rectangle.

  The most common "Syntax" error is pressing [(-)] when you should have pressed [−], or vice versa:

  1. Press the [(-)] key when you want to take the opposite of a number or are working with negative numbers. To compute $-5(-2)$, press [(-)] **5** [(] [(-)] **2** [)].
  2. Press the [−] key when you want to subtract two numbers. To compute $5 - 2$, press **5** [−] **2**.
- The **Invalid** error (see Fig. 27) means that you have tried to enter an inappropriate number, expression, or command. The most common "Invalid" error is to try to enter a number that is not between Xmin and Xmax, inclusive, when you use a command such as [TRACE], "minimum," or "maximum."

- The **Invalid dimension** error (see Fig. 28) means that you have the plotter turned on (see Fig. 29) but have not entered any data points in the STAT list editor (see Fig. 30). In this case, first press ENTER to exit the error message display; then either turn the plotter off or enter data in the STAT list editor.

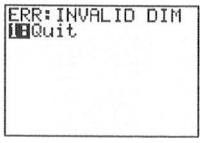

Figure 28 "Invalid dimension" error message

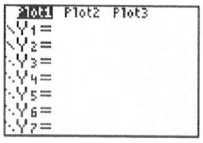

Figure 29 Plotter is on

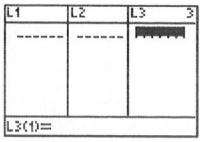

Figure 30 STAT list editor's columns are empty

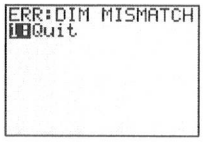

Figure 31 "Dimension mismatch" error message

- The **Dimension mismatch** error (see Fig. 31) is fixed in two ways:
  1. In the STAT list editor, one column that you are using to plot has more numbers than the other column has (see Fig. 32). In this case, first press ENTER to exit the error message display; then add or delete numbers so that the two columns have the same length.

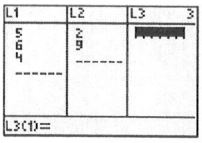

Figure 32 Columns of unequal length in STAT list editor

  2. In the STAT list editor, one column that you are using to plot has more numbers than the other column has, but you didn't notice the difference in length because you deleted one or both of the columns by mistake. You can find the missing column(s) by pressing STAT **5** ENTER.

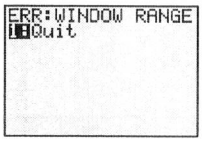

Figure 33 "Window range" error message

- The **Window range** error (see Fig. 33) means one of two things:
  1. You made an error in setting up your window. This usually means that you entered a larger number for *Xmin* than for *Xmax* or that you entered a larger number for *Ymin* than for *Ymax*. In this case, first press ENTER to exit the error message display; then change your window settings accordingly (see Section B.7).
  2. You pressed ZOOM **9** when only one data-point pair was entered in the STAT list editor. (On some TI graphing calculators, the command ZoomStat works only when you have two or more pairs of data points in the STAT list editor.) In this case, first press ENTER to exit the error message display; then either add more points to the STAT list editor or avoid pressing ZOOM **9** and set up your window settings manually (see Section B.7).

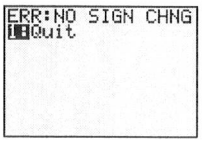

Figure 34 "No sign change" error message

- The **No sign change** error (see Fig. 34) means one of two things:
  1. You are trying to locate a point that does not appear on the screen. For example, you may be trying to find an intersection point of two curves that intersect offscreen. Or you may be trying to find a zero of an equation that does not appear on the screen. In this case, press ENTER and change your window settings so that the point you are trying to locate is on the screen.
  2. You are trying to locate a point that does not exist. For example, you may be trying to find an intersection point of two parallel lines. Or you may be trying to find a zero of an equation that does not have one. In this case, press ENTER and stop looking for the point that doesn't exist!

- The **Nonreal answer** error (see Fig. 35) means that your computation did not yield a real number. For example, $\sqrt{-4}$ is not a real number. The calculator will locate this computation if you choose "Goto" by pressing $\boxed{\triangledown}$, then $\boxed{\text{ENTER}}$.

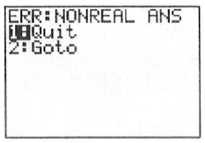

Figure 35 "Nonreal answer" error message

- The **Divide by 0** error (see Fig. 36) means that you asked the calculator to perform a calculation that involves a division by zero. For example, $3 \div (5 - 5)$ will yield the error message shown in Fig. 36.

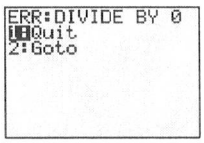

Figure 36 "Divide by zero" error message

The calculator will locate the division by zero if you choose "Goto" by pressing $\boxed{\triangledown}$, then $\boxed{\text{ENTER}}$.