Appendix T

Review of Technical Skills

Part 1 Using the TI-83 Plus and TI-84 Graphing Calculators

T–1	Preparing the Calculator	585
T–2	Entering and Graphing a Function	585
T–3	Evaluating a Function	586
T–4	Changing Window Settings	586
T–5	Using the Split Screen	587
T–6	Using the TABLE Feature	587
T–7	Making a Table of Differences	588
T–8	Finding the Zeros of a Function	588
T–9	Finding the Maximum or Minimum Value of a Function	589
T–10	Graphing the Inverse of a Function	590
T–11	Creating a Scatter Plot and Determining a Line or Curve of Best Fit Using Regression	591
T–12	Finding the Points of Intersection of Two Functions	592
T–13	Evaluating Trigonometric Ratios and Finding Angles	593
T–14	Graphing a Trigonometric Function	594
T–15	Evaluating Powers and Roots	595
T–16	Graphing a Piecewise Function	595
T–17	Drawing Tangent Lines	596

Part 2 Using a Spreadsheet

T–18	Introduction to Spreadsheets	597

Part 3 Using *The Geometer's Sketchpad*

T–19	Graphing a Function	599
T–20	Graphing a Trigonometric Function	600

Part 4 Using *Fathom*

T–21	Creating a Scatter Plot and Determining the Equation of a Line or Curve of Good Fit	602

PART 1 USING THE TI-83 PLUS AND TI-84 GRAPHING CALCULATORS

T–1 Preparing the Calculator

Before you graph a function, be sure to clear any information left on the calculator from the last time it was used. You should always do the following:

1. **Clear all data in the lists.**

   Press 2nd + 4 ENTER.

2. **Turn off all stat plots.**

   Press 2nd Y= 4 ENTER.

3. **Clear all equations in the equation editor.**

   Press Y=, and then press CLEAR for each equation.

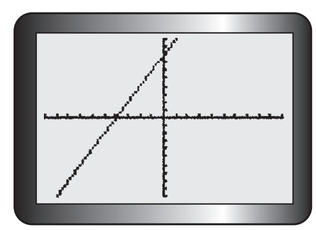
4. **Set the window so that the axes range from −10 to 10.**

   Press ZOOM 6. Press WINDOW to verify.

T–2 Entering and Graphing a Function

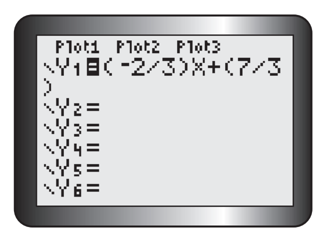
1. **Enter the equation of the function in the equation editor.**

   To graph $y = 2x + 8$, press Y= 2 X, T, Θ, *n* + 8 GRAPH. The graph will be displayed as shown.



2. **Enter all linear equations in the form $y = mx + b$.**

   If m or b are fractions, enter them between brackets. For example, write $2x + 3y = 7$ in the form $y = -\frac{2}{3}x + \frac{7}{3}$, and enter it as shown.

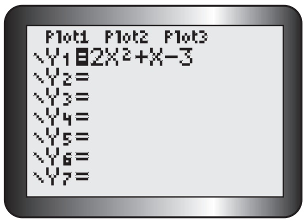


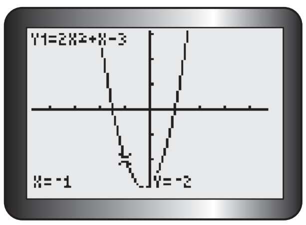
3. **Press GRAPH to view the graph.**

4. **Press TRACE to find the coordinates of any point on the graph.**

   Use the left and right arrow keys to cursor along the graph.
   Press ZOOM 8 ENTER TRACE to trace using integer intervals. If you are working with several graphs at the same time, use ▲ and ▼ to scroll between graphs.

T–3 Evaluating a Function





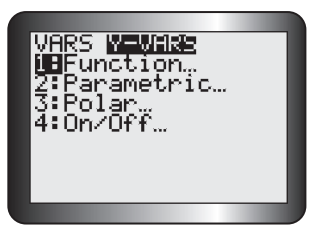
1. **Enter the function in the equation editor.**

   To enter $y = 2x^2 + x - 3$, press [Y=] [2] [X, T, Θ, *n*] [x^2] [+] [X, T, Θ, *n*] [−] [3].

2. **Use the value operation to evaluate the function.**

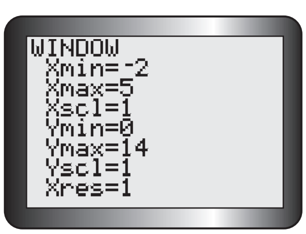
   To find the value of the function at $x = -1$, press [2nd] [TRACE] [ENTER], enter [(−)] [1] at the cursor, and then press [ENTER].

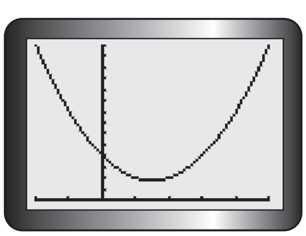
3. **Use function notation and the Y-VARS operation to evaluate the function.**
   This is another way to evaluate the function. To find the value of the function at $x = 37.5$, press [CLEAR] [VARS]. Then cursor right to **Y-VARS**, and press [ENTER]. Press [1] to select **Y1**. Finally, press [(] [3] [7] [.] [5] [)], and then [ENTER].



T–4 Changing Window Settings

The window settings can be changed to show a graph for a given domain and range.





1. **Enter the function in the equation editor.**
   For example, enter $y = x^2 - 3x + 4$ in the equation editor.

2. **Use the WINDOW function to set the domain and range.**

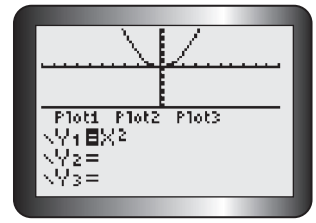
   To display the function over the domain $\{x \mid -2 \le x \le 5\}$ and range $\{y \mid 0 \le y \le 14\}$, press [WINDOW] [(−)] [2] [ENTER], then [5] [ENTER], then [1] [ENTER], then [0] [ENTER], then [1] [4] [ENTER], then [1] [ENTER], and finally [1] [ENTER].

3. **Press [GRAPH] to show the function with this domain and range.**

T–5 Using the Split Screen

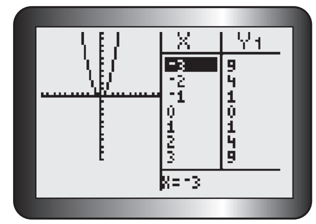
1. **The split screen can be used to see a graph and the equation editor at the same time.**

   Press MODE and cursor to **Horiz**. Press ENTER to select this, and then press 2nd MODE to return to the home screen. Enter $y = x^2$ in **Y1** of the equation editor, and then press GRAPH.

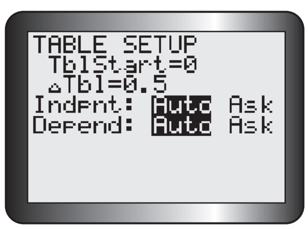


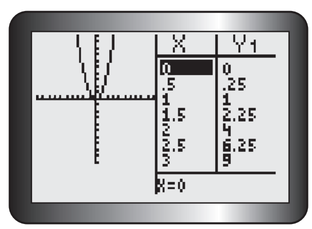
2. **The split screen can also be used to see a graph and a table at the same time.**

   Press MODE, and move the cursor to **G–T** (Graph-Table). Press ENTER to select this, and then press GRAPH.



   It is possible to view the table with different increments. For example, to see the table start at $x = 0$ and increase in increments of 0.5, press 2nd WINDOW and adjust the settings as shown. Then press GRAPH.





T–6 Using the TABLE Feature

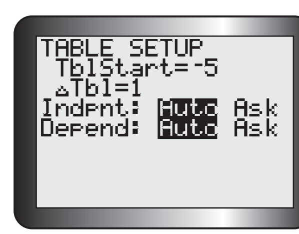
A function can be displayed in a table of values.

1. **Enter the function in the equation editor.**

   To enter $y = -0.1x^3 + 2x + 3$, press Y= (−) . 1 X, T, Θ, *n* ^ 3 + 2 X, T, Θ, *n* + 3.

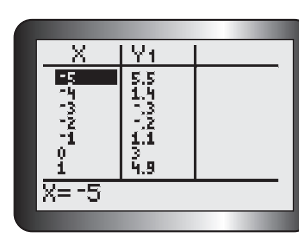
2. **Set the start point and step size for the table.**

   Press 2nd WINDOW. The cursor is beside "TblStart=." To start at $x = -5$, press (−) 5 ENTER. The cursor is now beside **ΔTbl=**. To increase the x-value in increments of 1, press 1 ENTER.



3. **To view the table, press 2nd GRAPH.**

   Use ▲ and ▼ to move up and down the table. Notice that you can look at higher or lower x-values than those in the original range.



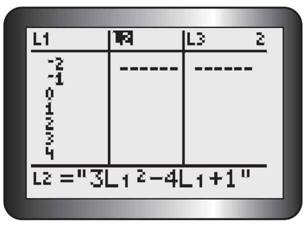
Appendix T

T–7 Making a Table of Differences

To make a table with the first and second differences for a function, use the STAT lists.

1. **Press** STAT 1**, and enter the *x*-values into L1.**

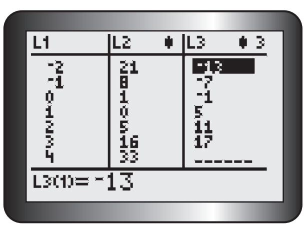
   For the function $f(x) = 3x^2 - 4x + 1$, use *x*-values from -2 to 4.



2. **Enter the function.**

   Scroll right and up to select **L2**. Enter the function $f(x)$, using **L1** as the variable *x*. Press ALPHA + 3 2nd 1 x^2 − 4 2nd 1 + 1 ALPHA +.

3. **Press** ENTER **to display the values of the function in L2.**

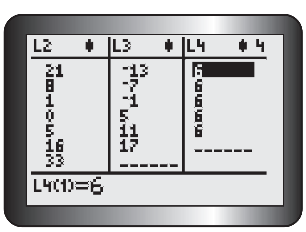


4. **Find the first differences.**

   Scroll right and up to select **L3**. Then press 2nd STAT.

   Scroll right to **OPS** and press 7 to choose **ΔList(**.

   Enter **L2** by pressing 2nd 2). Press ENTER to see the first differences displayed in **L3**.



5. **Find the second differences.**

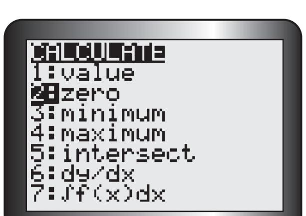
   Scroll right and up to select **L4**. Repeat step 4, using **L3** instead of **L2**. Press ENTER to see the second differences displayed in **L4**.

T–8 Finding the Zeros of a Function

To find the zeros of a function, use the **zero** operation.

1. **Start by entering the function in the equation editor.**

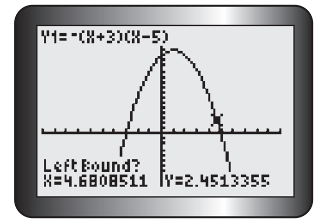
   For example, enter $y = -(x + 3)(x - 5)$ in the equation editor. Then press GRAPH ZOOM 6.



2. **Access the zero operation.**

   Press 2nd TRACE 2.

3. **Use the left and right arrow keys to cursor along the curve to any point that is left of the zero.**



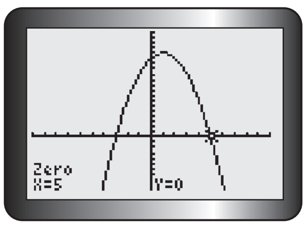
   Press ENTER to set the left bound.

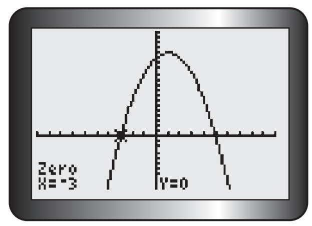
4. **Cursor along the curve to any point that is right of the zero.**

   Press ENTER to set the right bound.

5. **Press ENTER again to display the coordinates of the zero (the *x*-intercept).**

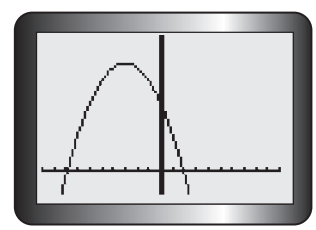
6. **Repeat to find the second zero.**





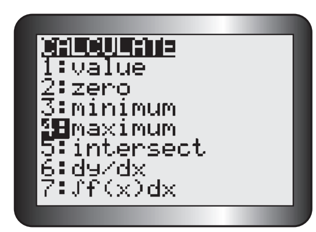
T–9 Finding the Maximum or Minimum Value of a Function

The least or greatest value can be found using the **minimum** operation or the **maximum** operation.



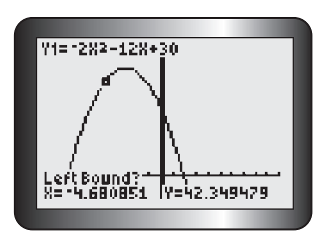
1. **Enter and graph the function.**
   For example, enter $y = -2x^2 - 12x + 30$.
   Graph the function, and adjust the window as shown. This graph opens downward, so it has a maximum.

2. **Use the maximum operation.**



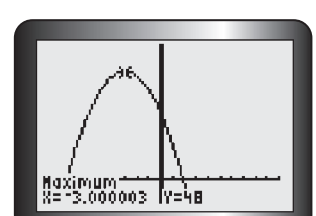
   Press 2nd TRACE 4. For parabolas that open upward, press 2nd TRACE 3 to use the **minimum** operation.

3. **Use ◀ and ▶ to cursor along the curve to any point that is left of the maximum value.**



   Press ENTER to set the left bound.

4. **Cursor along the curve to any point that is right of the maximum value.**



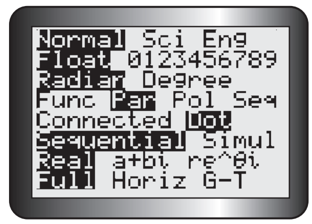
   Press ENTER to set the right bound.

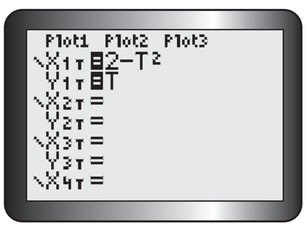
5. **Press ENTER again to display the coordinates of the optimal value.**

T–10 Graphing the Inverse of a Function

Parametric equations allow you to graph any function and its inverse. For example, the function $y = 2 - x^2$, with domain $x \geq 0$, can be graphed using parametric mode. For a parametric equation, both x and y must be expressed in terms of a parameter, t. Replace x with t. Then $x = t$ and $y = 2 - t^2$. The inverse of this function can now be graphed.

1. **Clear the calculator, and press** MODE **.**
   Change the setting to the parametric mode by scrolling down to the fourth line and to the right to **Par**, as shown on the screen below. Press ENTER .



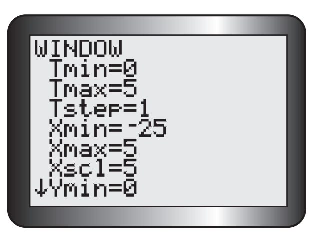


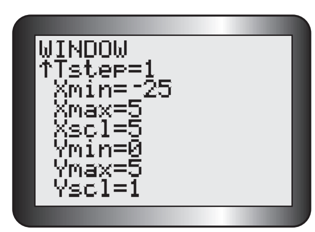
2. **Enter the inverse function by changing the parametric equations $x = t$ and $y = 2 - t^2$ to $x = 2 - t^2$ and $y = t$.**

   Press Y= . At X1T=, enter 2 − X, T, Θ, *n* x^2 ENTER . At Y1T=, enter X, T, Θ, *n* .

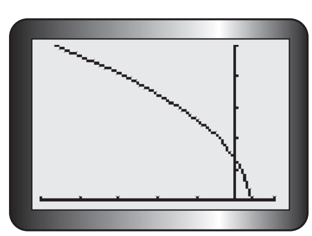
3. **Press** WINDOW **.**

   The original domain, $x \geq 0$, is also the domain of t. Use window settings, such as those shown below, to display the graph.





4. **Press** GRAPH **to display the inverse function.**



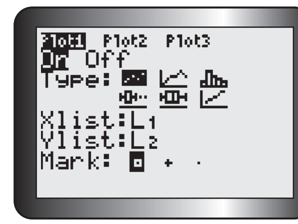
T–11 Creating a Scatter Plot and Determining a Line or Curve of Best Fit Using Regression

This table gives the height of a baseball above ground, from the time it was hit to the time it touched the ground.

Time (s)	0	1	2	3	4	5	6
Height (m)	2	27	42	48	43	29	5

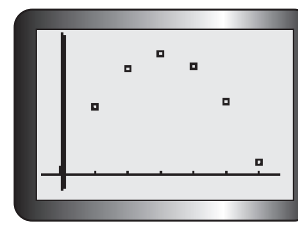
1. **Start by entering the data into lists.**

   Press STAT ENTER. Move the cursor over to the first position in **L_1**, and enter the values for time. Press ENTER after each value. Repeat this for height in **L_2**.



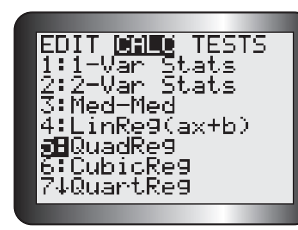
2. **Create a scatter plot.**

   Press 2nd Y= and 1 ENTER. Turn on Plot 1 by making sure that the cursor is over **On**, the **Type** is set to the graph type you prefer, and **L_1** and **L_2** appear after **Xlist** and **Ylist**.



3. **Display the graph.**

   Press ZOOM 9 to activate **ZoomStat**.

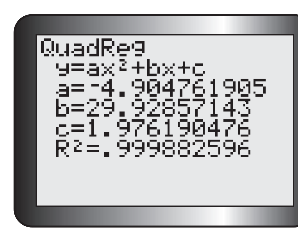


4. **Apply the appropriate regression analysis.**

   To determine the equation of the line or curve of best fit, press STAT and scroll over to **CALC**. Press

   - 4 to enable **LinReg(ax+b)**
   - 5 to enable **QuadReg**
   - 6 to enable **CubicReg**
   - 7 to enable **QuartReg**
   - 0 to enable **ExpReg**
   - ALPHA C to enable **SinReg**

   Then press 2nd 1 , 2nd 2 , VARS. Scroll over to **Y-VARS**. Press 1 twice. This action stores the equation of the line or curve of best fit into **Y1** of the equation editor.

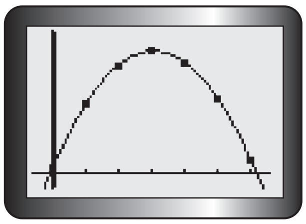


Appendix T

5. **Display and analyze the results.**

Press ENTER. In this example, the letters a, b, and c are the coefficients of the general quadratic equation $y = ax^2 + bx + c$ for the curve of best fit. R^2 is the percent of data variation represented by the model. The equation is about $y = -4.90x^2 + 29.93x + 1.98$.

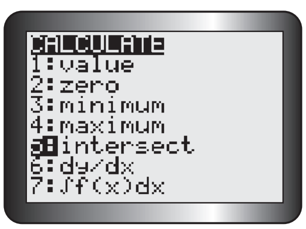
Note: For linear regression, if r is not displayed, turn on the diagnostics function. Press 2nd 0, and scroll down to **DiagnosticOn**. Press ENTER twice. Repeat steps 4 to 6.



6. **Plot the curve.**

Press GRAPH

T–12 Finding the Points of Intersection of Two Functions



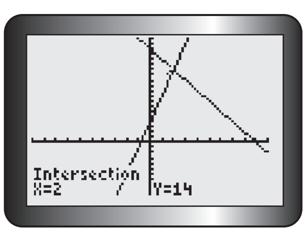
1. **Enter both functions in the equation editor.**
For example, enter $y = 5x + 4$ and $y = -2x + 18$.

2. **Graph both functions**.

Press GRAPH. Adjust the window settings until one or more points of intersection are displayed.

3. **Use the intersect operation.**

Press 2nd TRACE 5.



4. **Determine a point of intersection**.
You will be asked to verify the two curves and enter a guess (optional) for the point of intersection. Press ENTER after each screen appears.

The point of intersection is exactly (2, 14).

5. **Determine any additional points of intersection.**

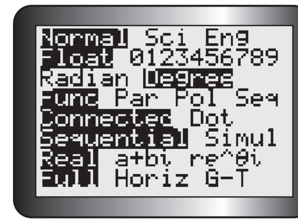
Press TRACE, and move the cursor close to the other point you wish to identify. Repeat step 4.

T–13 Evaluating Trigonometric Ratios and Finding Angles

Working with Degrees

1. **Put the calculator in degree mode.**

   Press MODE. Scroll down and across to **Degree**. Press ENTER.

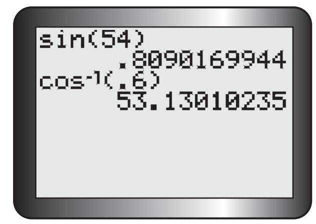


2. **Use the SIN, COS, or TAN key to calculate a trigonometric ratio.**

   To find the value of sin 54°, press SIN 5 4) ENTER.

3. **Use SIN^{-1}, COS^{-1}, or TAN^{-1} to calculate an angle.**

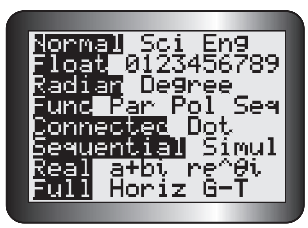
   To find the angle whose cosine is 0.6, press 2nd COS . 6) ENTER.



Working with Radians

1. **Put the calculator in radian mode.**

   Press MODE. Scroll down and across to **Radian**. Press ENTER.

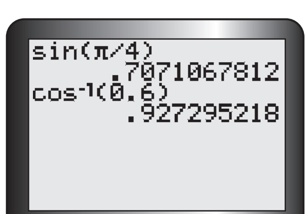


2. **Use the SIN, COS, or TAN key to calculate a trigonometric ratio.**

   To find the value of sin $\frac{\pi}{4}$, press SIN 2nd ^ ÷ 4) ENTER.

3. **Use SIN^{-1}, COS^{-1}, or TAN^{-1} to calculate an angle.**

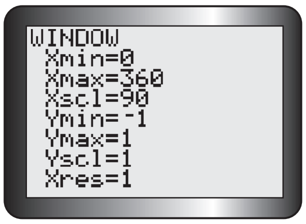
   To find the angle whose cosine is 0.6, press 2nd COS . 6) ENTER.



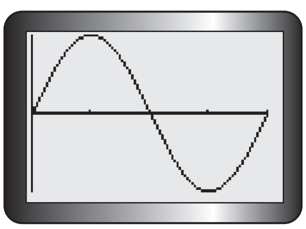
T–14 Graphing a Trigonometric Function

Working with Degrees

You can graph a trigonometric function in degree measure using the TI-83 Plus or TI-84 calculator.



step 3



step 4

1. **Put the calculator in degree mode.**

   Press MODE. Scroll down and across to **Degree**. Press ENTER.

2. **Enter the function in the equation editor.**

   For example, to graph the function $y = \sin x$, for $0° \leq x \leq 360°$, press

   Y= SIN X, T, Θ, *n*).

3. **Adjust the window to correspond to the given domain.**

   Press WINDOW. Set **Xmin = 0**, **Xmax = 360**, and **Xscl = 90**. These settings display the graph from 0° to 360°, using an interval of 90° on the x-axis. Then set **Ymin = −1** and **Ymax = 1**, since the sine function being graphed lies between these values. If the domain is not known, this step can be omitted.

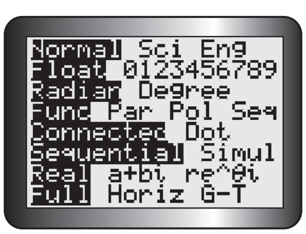
4. **Graph the function using ZoomFit.**

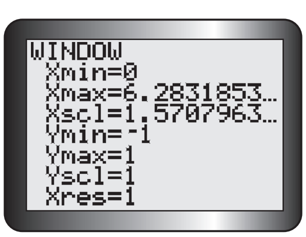
   Press ZOOM 0. The graph is displayed over the domain, and the calculator determines the best values to use for **Ymax** and **Ymin** in the display window.

   Note: You can use **ZoomTrig** (press ZOOM 7) to graph the function in step 4. **ZoomTrig** will always display the graph in a window where **Xmin = −360°**, **Xmax = 360°**, **Ymin = −4**, and **Ymax = 4**.

Working with Radians

You can also graph a trigonometric function in radians using the TI-83 Plus or TI-84 calculator.





1. **Put the calculator in radian mode.**

   Press MODE. Scroll down and across to **Radian**. Press ENTER.

2. **Enter the function in the equation editor.**

   For example, to graph the function $y = \sin x$, for $0 \leq x \leq 2\pi$, press

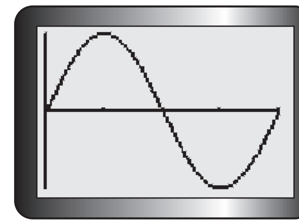
   Y= SIN X, T, Θ, *n*).

3. **Adjust the window to correspond to the given domain.**

   Press WINDOW. Set **Xmin = 0**, **Xmax = 2π**, and **Xscl = $\frac{\pi}{2}$**. These settings display the graph from 0 to 2π, using an interval of $\frac{\pi}{2}$ on the x-axis. Then set **Ymin = −1** and **Ymax = 1**, since the sine function being graphed lies between these values. If the domain is not known, this step can be omitted.

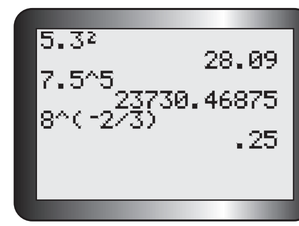
4. **Graph the function using ZoomFit.**

Press $\boxed{\text{ZOOM}}$ $\boxed{0}$. The graph is displayed over the domain, and the calculator determines the best values to use for **Ymax** and **Ymin** in the display window.



Note: You can use **ZoomTrig** (press $\boxed{\text{ZOOM}}$ $\boxed{7}$) to graph the function in step 4. **ZoomTrig** will always display the graph in a window where **Xmin** $= -2\pi$, **Xmax** $= 2\pi$, **Ymin** $= -4$, and **Ymax** $= 4$.

T–15 Evaluating Powers and Roots



1. **Evaluate the power $(5.3)^2$.**

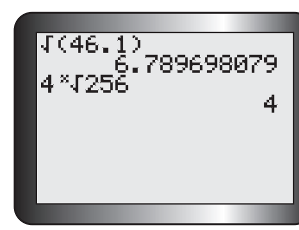
Press $\boxed{5}$ $\boxed{.}$ $\boxed{3}$ $\boxed{x^2}$ $\boxed{\text{ENTER}}$.

2. **Evaluate the power 7^5.**

Press $\boxed{7}$ $\boxed{\wedge}$ $\boxed{5}$ $\boxed{\text{ENTER}}$.

3. **Evaluate the power $8^{-\frac{2}{3}}$.**

Press $\boxed{8}$ $\boxed{\wedge}$ $\boxed{(}$ $\boxed{-}$ $\boxed{2}$ $\boxed{\div}$ $\boxed{3}$ $\boxed{)}$ $\boxed{\text{ENTER}}$.



4. **Evaluate the square root of 46.1.**

Press $\boxed{\text{2nd}}$ $\boxed{x^2}$ $\boxed{4}$ $\boxed{6}$ $\boxed{.}$ $\boxed{1}$ $\boxed{)}$ $\boxed{\text{ENTER}}$.

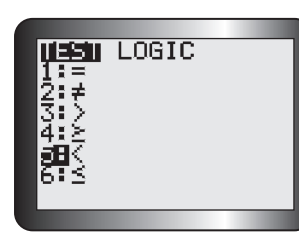
5. **Evaluate $\sqrt[4]{256}$.**

Press $\boxed{4}$ $\boxed{\text{MATH}}$ $\boxed{5}$ $\boxed{2}$ $\boxed{5}$ $\boxed{6}$ $\boxed{\text{ENTER}}$.

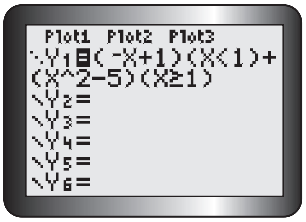
T–16 Graphing a Piecewise Function

Follow these steps to graph the piecewise function defined by

$$f(x) = \begin{cases} -x + 1, \text{ if } x < 1 \\ x^2 - 5, \text{ if } x \geq 1 \end{cases}$$

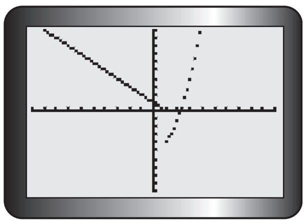


1. **Enter the first equation.**
In the equation editor for **Y1**, enter the first equation in brackets. Then enter its corresponding interval in brackets. The inequality signs can be accessed in the **Test** menu by pressing $\boxed{\text{2nd}}$ $\boxed{\text{MATH}}$.



2. **Enter the second equation.**

   Press [+], and repeat step 1 for the second equation and its interval. Scroll to the left of **Y1**, and press [ENTER] until the dotted graphing mode appears.



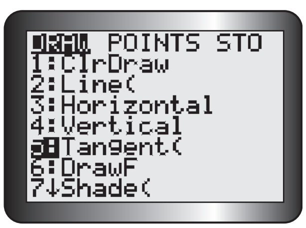
3. **Display the graph.**

   Press [GRAPH] to display the graph.
   Each equation produces a different graph on each interval. This function is discontinuous at $x = 1$.

T–17 Drawing Tangent Lines

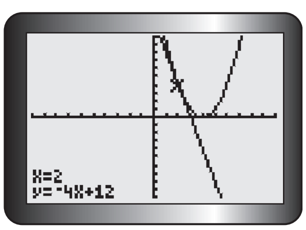
1. **Enter the function, and display the graph.**

   Enter $y = (4 - x)^2$ into **Y1** of the equation editor, and display the graph.



2. **Draw the tangent line, and estimate its slope.**

   Use the **Tangent** command in the **Draw** menu to draw a tangent line at point (2, 4) and estimate its slope.
   Press [2nd] [PRGM] . Choose **5:Tangent(** and then press [2] and [ENTER] .
   The tangent line is drawn, and its equation is displayed.



   The slope of the tangent line is -4, and its y-intercept is 12.

3. **Clear the tangent line.**

   Press [2nd] [PRGM] [1] to clear the tangent line. The function will be graphed again, without the tangent line.

PART 2 USING A SPREADSHEET

T–18 Introduction to Spreadsheets

A spreadsheet is a computer program that can be used to create a table of values and then graph the values. It is made up of cells that are identified by column letter and row number, such as A2 or B5. A cell can hold a label, a number, or a formula.

Creating a Table

Use a spreadsheet to solve a problem like this:

> How long will it take to double your money if you invest $1000 at 5%/a, compounded quarterly?

To create a spreadsheet, label cell A1 as Number of Quarters, Cell B1 as Time (years), and cell C1 as Amount ($). Enter the initial values of 0 in A2, 0 in B2, and 1000 in C2. Enter the formula = A2 + 1 in A3, the formula = A3/4 in B3, and the formula = 1000*(1.0.125)^A3 in C3 to generate the next values in the table.

	A	B	C
1	**Number of Quarters**	**Time (years)**	**Amount ($)**
2	0	0	1000
3	=A2+1	=A3/4	-1000*(1.0125^A3)
4			

Notice that an equal sign is in front of each formula, an asterisk (*) is used for multiplication, and a caret (^) is used for an exponent.

	A	B	C
1	**Number of Quarters**	**Time (years)**	**Amount ($)**
2	0	0	1000
3	1	0.25	
4			

Use the cursor to select cells A3 to C3 and several rows of cells below them. Then use the **Fill Down** command to insert the appropriate formula into the selected cells. The computer will automatically calculate and enter the values in the cells, as shown in the screen on the left.

Continue to select the cells in the last row of the table. Use the **Fill Down** command to generate more values until the solution appears, as shown below in the screen on the right.

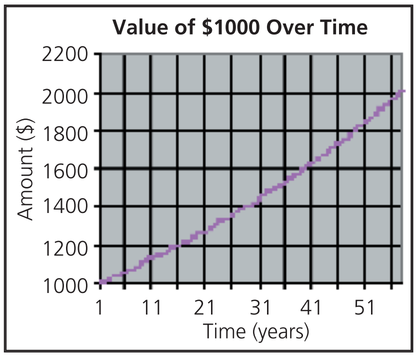
	A	B	C
1	**Number of Quarters**	**Time (years)**	**Amount ($)**
2	0	0	1000
3	1	0.25	1012.50
4	2	0.5	1025.16
5	3	0.75	1037.97
6	4	1	1050.94

	A	B	C
1	**Number of Quarters**	**Time (years)**	**Amount ($)**
2	0	0	1000
3	1	0.25	1012.50
4	2	0.5	1025.1563
⋮	⋮	⋮	⋮
56	54	13.5	1955.8328
57	55	13.75	1980.2807
58	56	14	2005.0342

Creating a Graph

Use the spreadsheet's graphing command to graph the results. Use the cursor to highlight the portion of the table you would like to graph. In this example, Time versus Amount is graphed.

	A	B	C
1	Number of Quarters	Time (years)	Amount ($)
2	0	0	1000
3	1	0.25	1012.50
4	2	0.5	1025.1563
⋮	⋮	⋮	⋮
56	54	13.5	1955.8328
57	55	13.75	1980.2807
58	56	14	2005.0342



Different spreadsheets have different graphing commands. Check the instructions for your spreadsheet to find the proper command.

Determining the Equation of the Curve of Best Fit

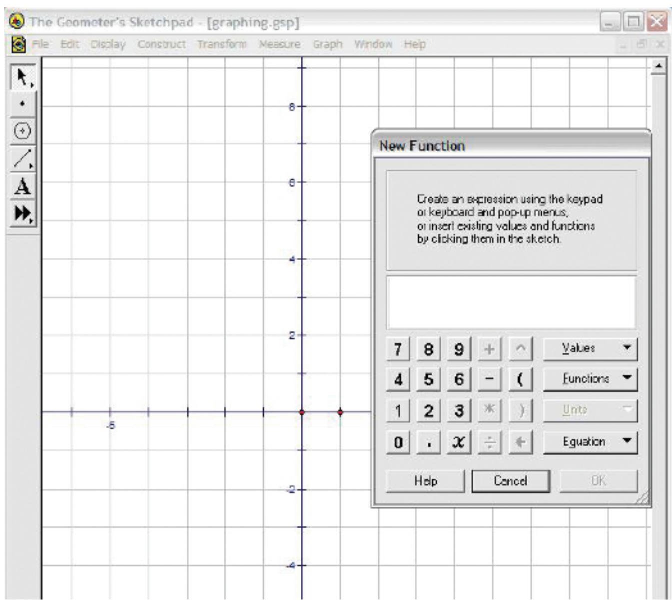
Different spreadsheets have different commands for finding the equation of the curve of best fit using regression. Check the instructions for your spreadsheet to find the proper command for the type of regression that suits the data.

PART 3 USING THE GEOMETER'S SKETCHPAD

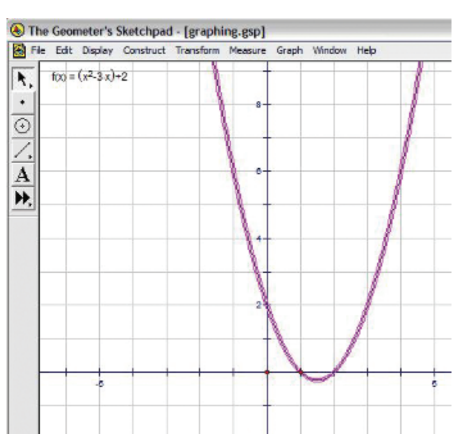
T–19 Graphing a Function

1. **Turn on the grid.**
   From the **Graph** menu, choose **Show Grid**.

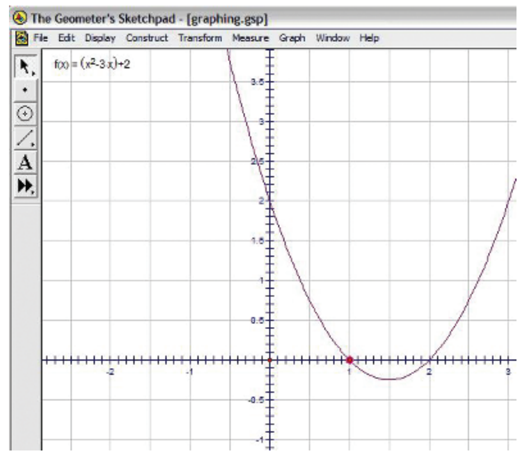
2. **Enter the function.**
   From the **Graph** menu, choose **Plot New Function**. The function calculator should appear.



3. **Graph the function.**
   To graph $y = x^2 - 3x + 2$, use either the calculator keypad or the keyboard to enter **x ^ 2 − 3 * x + 2**. Then press OK on the calculator keypad. The graph of $y = x^2 - 3x + 2$ should appear on the grid.



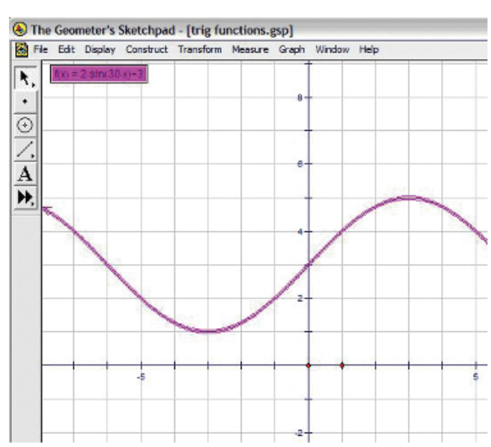
4. **Adjust the origin and/or scale.**
   To adjust the origin, left-click on the point at the origin to select it. Then left-click and drag the origin as desired.
   To adjust the scale, left-click in blank space to deselect the origin, and then left-click on the point at (1, 0) to select it. Left-click and drag this point to change the scale.



T–20 Graphing a Trigonometric Function

1. **Turn on the grid.**
   From the **Graph** menu, choose **Show Grid**.

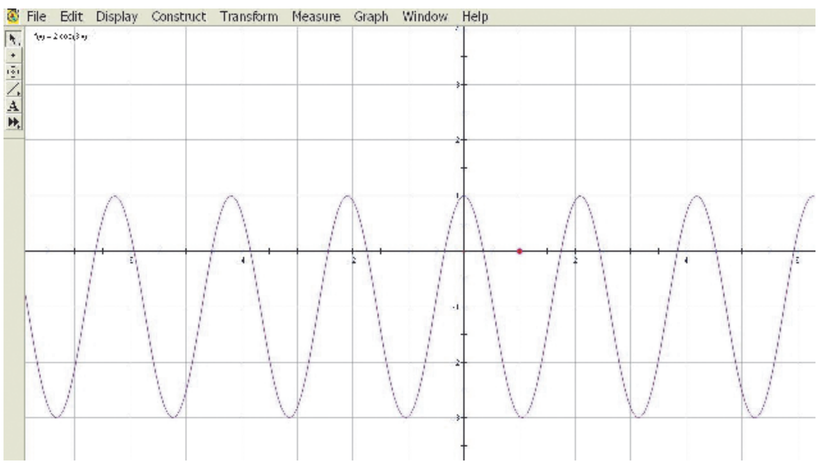
2. **Graph the function $y = 2 \sin (30x) + 3$ using degrees.**
   From the **Graph** menu, choose **Plot New Function**. The function calculator should appear.
   Use either the calculator keypad or the keyboard to enter
   2 * sin (30 * *x*) + 3. To enter sin, use the pull-down **Functions** menu on the calculator keypad. Click OK on the calculator keypad.
   Click on **No** in the pop-up panel to keep degrees as the unit. The graph of $y = 2 \sin (30x) + 3$ should appear on the grid.



3. Graph the function $y = 2\cos(3x) - 1$ using radians.
From the **Graph** menu, choose **Plot New Function**. The function calculator should appear.
Use either the calculator keypad or the keyboard to enter **2 * cos (3 * x) − 1**.
To enter cos, use the pull-down **Functions** menu on the calculator keypad.

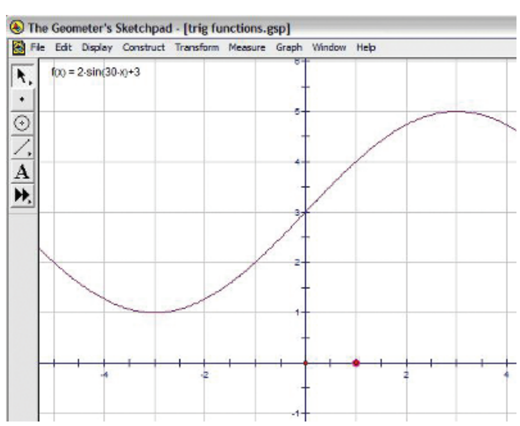
Click OK on the calculator keypad.

Click on **Yes** in the pop-up panel to change the unit to radians. The graph of $y = 2\cos(3x) - 1$ should appear on the grid.



Note: Selecting **Preferences** from the **Edit** menu will also allow you to change from radians to degrees or from degrees to radians.

4. Adjust the origin and/or scale.
Left-click on and drag either the origin or the point $(1, 0)$.



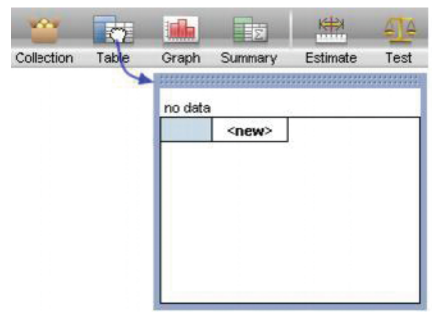
Appendix T

PART 4 USING FATHOM

T–21 Creating a Scatter Plot and Determining the Equation of a Line or Curve of Good Fit

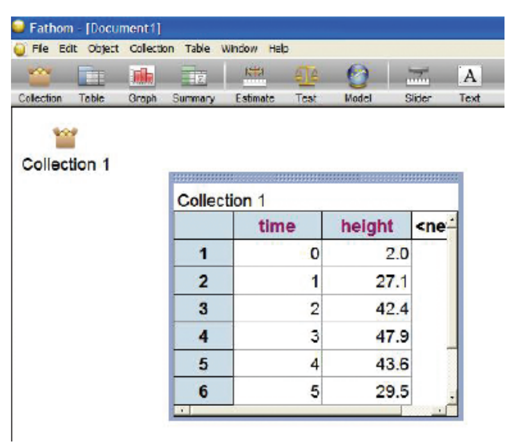
1. Create a case table.

Drag a case table from the object shelf, and drop it in the document.

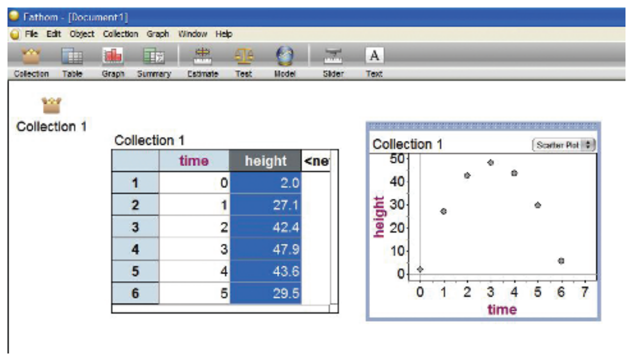


2. Enter the Variables and Data.

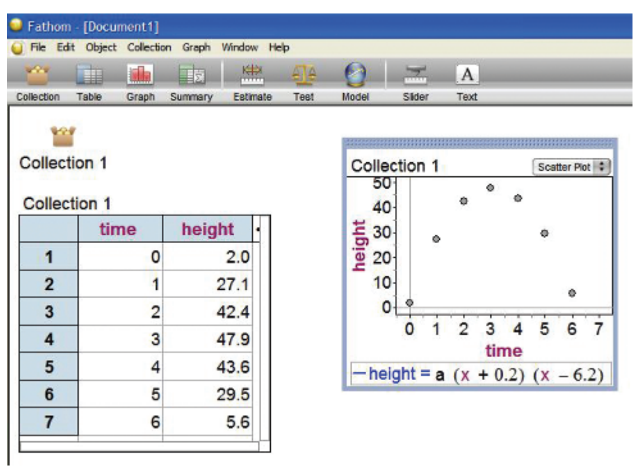
Click on **<new>**, type a name for the new variable or attribute, and press ENTER . (If necessary, repeat this step to add more attributes. Pressing TAB instead of ENTER moves you to the next column.) When you name your first attribute, *Fathom* creates an empty collection to hold your data (a little, empty box). This is where your data are actually stored. Deleting the collection deletes your data. When you add cases by typing values, the collection icon fills with gold balls. To enter the data, click in the blank cell under the attribute name and begin typing values. (Press TAB to move from cell to cell.)



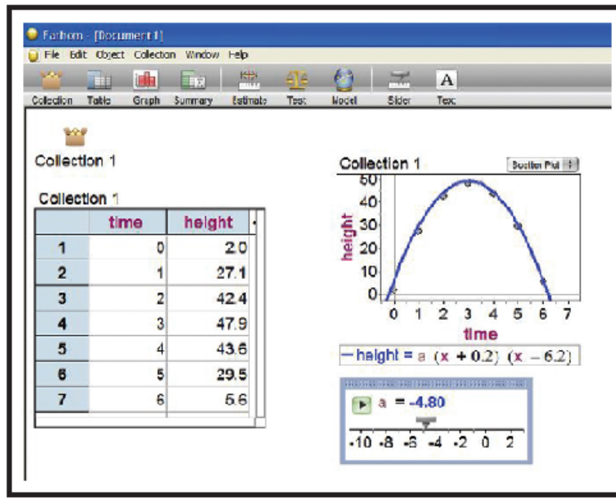
3. **Graph the data.**
Drag a new graph from the object shelf at the top of the *Fathom* window, and drop it in a blank space in your document. Drag an attribute from the case table, and drop it on the prompt below and/or to the left of the appropriate axis in the graph.



4. **Create a function.**
Right-click the graph, and select **Plot Function.** Enter your function using a parameter that can be adjusted to fit the curve to the scatter plot (**a** was used below).



5. **Create a slider for the parameter.**
   Drag a new slider from the object shelf at the top of the *Fathom* window, and drop it in a blank space below your graph. Over **V1**, type the letter of the parameter used in step 4. Click on the number, and then adjust the value of the slider until you are satisfied with the fit.



The equation of a curve of good fit is $y = -4.8(x + 0.2)(x - 6.2)$.