

# TI-89/TI-92 Plus/Voyage™ 200 CellSheet™

## How To...

- Navigate in Spreadsheets
- Cut, Copy, and Paste
- Format Spreadsheets
- Select, Insert, or Delete

## Manipulate Data

- Enter Data
- Sort Data
- Use Statistics
- Edit Data
- Plot Data
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- Maximum Area

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- Menu Map
- Error Messages
- Key Shortcuts



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The instructions in this guidebook refer to this Flash application only. For help using the TI-89 / TI-92 Plus / Voyage™ 200 PLT, refer to the comprehensive guidebook at [education.ti.com/guides](http://education.ti.com/guides).

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# What Is the CellSheet™ Application?

The CellSheet application (App) is a spreadsheet in the palm of your hand. It combines spreadsheet functionality with the power of a calculator and supplements other calculator software applications. The application is useful in classes such as math, social studies, business, and science.

Cells can contain:

- Real or complex numbers
- Formulas
- Expressions
- Variables
- Text strings
- Functions that evaluate to expressions

Each spreadsheet contains 999 rows and 64 columns. A spreadsheet variable can be no larger than 64 kilobytes (KB).

You can use a unit-to-unit cable to share spreadsheets with other TI-89 and TI-92 Plus / Voyage™ 200 PLT units. A CellSheet™ computer-based utility is available separately. The utility lets you share TI-89 and TI-92 Plus / Voyage 200 PLT spreadsheets with Excel and other programs. You can also use the utility to convert and share spreadsheets with TI-83 Plus and TI-83 Plus Silver Edition units. Please see [education.ti.com](http://education.ti.com) for more information about the CellSheet computer-based utility.

## Languages

This application is available in English, Danish, Dutch, Finnish, French, German, Italian, Norwegian, Portuguese, Spanish, Swedish. The corresponding language localization software must also be installed and running.

# Overview

The 64 columns are labeled A through BL. Rows are numbered 1 through 999. Although you may insert and delete columns and rows, columns will always be labeled A-BL and rows will always be numbered 1-999. You cannot change the alphabetical column labels or row numbers.

Individual cells are referred to by their column letter and row number. For example, B25 refers to the 25th cell in column B. Cell ranges are separated by a colon. For example, A1:C5 refers to the rectangular range that has the 1st cell in column A as its top left corner and the 5th cell in column C as its bottom right corner.

Spreadsheet  
name

Row number

F1 File	F2 Plot	F3 Edit	F4 Undo	F5 %	F6 Funcs	F7 Stat	F8 ReCalc	
int	A			B		C		D
1	1500			22.5		45.		
2	1477.5			22.163		44.325		
3	1455.3			21.83		43.66		
4	1433.5			21.503		43.005		
5	1412.			21.18		42.36		
A1:	1500							
MAIN				RAD AUTO		FUNC		

Column letter

Edit line

# Navigating and Selecting Cells

Press **[F1] B:Help** for a [help screen](#) that shows [key shortcuts](#) for navigating and selecting.

## Navigating

- **[↑]**, **[↓]**, **[←]**, or **[→]** moves the cursor from the current cell to an adjacent cell.
- **[↶]** **[→]** or **[↷]** **[←]** moves the cursor to the first or last cell in a column.
- **[↶]** **[↓]** or **[↷]** **[↑]** moves the cursor to the first or last cell in a row.
- **[2nd]** **[←]** or **[2nd]** **[→]** moves the cursor several rows up or down.
- **[2nd]** **[↓]** or **[2nd]** **[↑]** moves the cursor several columns to the right or left.
- **[F3] 1:GoTo** moves the cursor to the cell you indicate.

### Tip

For the TI-89 only, press **[alpha]** in the CellSheet™ App dialog boxes before typing letters.

## Selecting multiple cells, rows, or columns

- **[F3] 2:Select Range** lets you select a range of cells by entering the range in the dialog box. You can also press and hold **[↑]** while pressing **[←]**, **[→]**, **[↑]**, or **[↓]** in the spreadsheet.
- **[♦] [←] [←]** or **[♦] [↑] [↑]** selects the entire row or column from the current cursor location. You can hold **[↑]** and press **[←]**, **[→]**, **[↑]**, or **[↓]** to select multiple rows or columns.

## Inserting a cell, row, or column

Select a cell, row, or column. **[2nd] [INS]** inserts a cell, row, or column above (for cells or rows) or to the left (for columns) of the current selection.

## Deleting a cell, row, or column

- **[♦] [DEL]** or **[←]** deletes a selected cell, row, or column and shifts the remaining cells, rows, or columns up or left one space.
- **[CLEAR]** clears the *contents* of the selected cell or range of cells without deleting the cell, row, or column.

# File Management

Pressing **[F1]** allows you to:

- Open an existing spreadsheet
- Save a copy of the current spreadsheet under a different name
- Create a new spreadsheet
- Cut, copy, and paste cells in a spreadsheet
- Clear the spreadsheet
- Format the appearance of data and set cursor movement direction
- Display a [help screen](#) with navigation and editing tips

## Opening an existing spreadsheet

1. Press **[F1]** **1:Open**.
2. Select the folder.
3. Select the name of the spreadsheet you want to open and press **[ENTER]**.



**Tips** You can open only one spreadsheet at a time. If a spreadsheet is archived, you must unarchive it before you can edit it.

## Saving a spreadsheet

The spreadsheet is automatically saved in Random Access Memory (RAM) as you work. You do not have to save your work manually. However, you can save the current spreadsheet with a new file name.

1. Press **[F1] 2:Save Sheet As**.
2. Select the folder.
3. Type the variable name for the spreadsheet, and press **[ENTER] [ENTER]**. You are still working in the current spreadsheet, not the one you just saved.

**Tips** The spreadsheet name can contain:

- Letters, numbers, and symbols, but must begin with a letter
- Up to 8 characters, but no spaces.

To access the saved spreadsheet, press **[F1] 1:Open** and select the name of the spreadsheet you just saved.

## Creating a new spreadsheet

1. Press **[F1] 3:New**.

2. Select the folder.
3. Type the variable name for the spreadsheet, and press **ENTER** **ENTER**.  
— or —  
Accept the suggested variable name and press **ENTER**.

## Using cut, copy, and paste

- **F1** **4:Cut** removes contents from the currently selected cell or range and places these contents on the clipboard to be pasted into other cells.

TI-89 shortcut: **◆** [CUT]. TI-92 Plus / Voyage™ 200 PLT shortcut: **◆** X.

- **F1** **5:Copy** copies the contents of the currently selected cell or range and places them on the clipboard to be pasted into other cells.

TI-89 shortcut: **◆** [COPY]. TI-92 Plus / Voyage 200 PLT shortcut: **◆** C.

- **F1** **6:Paste** pastes the contents of the clipboard into the currently selected cell or range.

TI-89 shortcut: **◆** [PASTE]. TI-92 Plus / Voyage 200 PLT shortcut: **◆** V.

You can cut, copy, and paste from cell to cell and from edit line to edit line, but not from cell to edit line or vice versa. If you copy or cut a cell reference from a cell and then paste it to another cell, the cell reference changes accordingly, but does not change if you copy from edit line to edit line.

## Example

1. In cell A1, enter =a4.
2. Select cell A1 and press **F1** **5:Copy**.
3. Select cell B1 and press **F1** **6:Paste**. Your spreadsheet should look like this:

	F1 File	F2 Plot	F3 Edit	F4 Undo	F5 Σ	F6 Funcs	F7 Stat	F8 Rec	F9 Col	
≤01	A		B		C		D			
1		0			0					
2										
3										
4										
5										
B1:	=B4									
MAIN DEGRACT FUNC										

Notice that A4 has automatically changed to B4.

4. In cell A2, enter =a5.
5. Go to the edit line for cell A2. Select =A5 and press **F1** **5:Copy**.

- Exit the edit line for cell A2 and access the edit line for cell B2. Press **[F1] 6:Paste** and then **[ENTER]**. Your spreadsheet should look like this:

F1- File	F2- Plot	F3- Edit	F4 Undo	F5 Σ	F6- Funcs	F7- Stat	F8 ReCalc	
≡01	A		B		C		D	
1		0		0				
2		0		0				
3								
4								
5								
B2:		=a5						
MAIN		DEGEXACT			FUNC			

Notice that A5 has stayed the same and has not changed to B5.

For more information about cut, copy, and paste, go to [Editing Data](#).

## Clearing a spreadsheet

To delete all the contents of a spreadsheet, Press **[F1] 8:Clear Sheet**. This action cannot be undone.

## Formatting data

Formatting allows you to choose:

- To have values calculated automatically as you enter data or to calculate the value for the active cell only. AutoCalc automatically recalculates the entire spreadsheet as you work. When AutoCalc is set to **NO**, cells with formulas containing references to other cells do not recalculate when you make changes to the referred cells.
- Whether the cursor automatically moves down or to the right as you enter data in cells.
- Whether a formula or a value is displayed in the edit line.

### Example

1. Press **[F1]** **9:Format**.
2. Select **1:YES** or **2:NO** for AutoCalc.
3. Select the cursor movement (**1:DOWN**, **2:RIGHT**, or **3:OFF**).
4. Select what the edit line will display (**1:FORMULA** or **2:VALUE**).
5. Press **[ENTER]**.

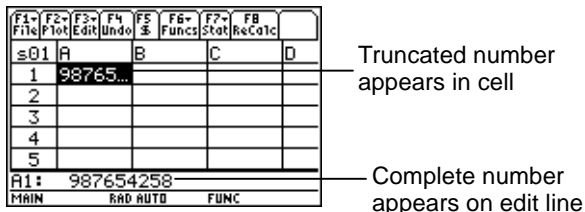
## Recalculating a spreadsheet

When you start the CellSheet™ App, the AutoCalc feature is turned on by default. If you turn it off, you must recalculate the spreadsheet manually.

To recalculate the spreadsheet, press **2nd** **[F8]** (TI-89) or **[F8]**.

# Entering Numbers

Type the number on the edit line and press **ENTER**. If the number is too large to fit in the cell, the partial number and an ellipsis (...) appear in the cell. Select the cell containing a truncated number to view the complete number on the edit line. The following screen contains an example of a truncated number.



## Example

1. On the edit line, enter 14/16.
2. Press **ENTER**. The cell displays 7/8.  
— or —  
Press **◆** **ENTER**. The cell displays .875.

## Entering Text

To ensure that text is treated as a string and not as a variable, type quotation marks at the beginning and end of the string. Text strings continue past the cell boundary as long as the next cell is blank. If the next cell contains information, the text is truncated in the cell. Select the cell containing truncated text to view the complete text string on the edit line.

To type letters on the TI-89, press **[alpha]** and then the letter key. Press **[2nd]** **[a-lock]** to turn on alpha-lock and **[alpha]** to turn off alpha-lock.



# Entering Symbolic Expressions

Symbolic expressions involve variables and other symbols such as  $\pi$  and  $\infty$ . You can enter symbolic expressions into cells and use them in formulas.

The CellSheet™ App handles variables in the following manner.

- You can use defined and undefined variables.
- If a variable is defined, its value will be substituted for the variable.
- If you use a variable in a symbolic expression and then change the variable's value outside of the CellSheet App, any cells using that variable will include the new value once those cells have been recalculated.
- You can use variables that are stored in any folder on your unit by including the folder name with the variable name.
- When cell names and defined variables are not part of a formula, they are replaced by their value.
- If a variable has the same name as a cell name, the value of the cell will be used unless you type the folder name and variable name, even if the variable is in the current folder.

## Example 1

The variable  $x$  does not have a value.

1. Type  $3x^2+2x$  on the edit line.
2. Press **[ENTER]**. The cell displays  $3*x^2\dots$ , and the edit line displays  $3x^2+2*x$ .

## Example 2

Assume that the variable PV (Present Value) is stored in a folder named FINANCE and its value is 12.

On the edit line, enter =finance\PV. The cell displays 12.

— or —

Enter = on the edit line, press **[2nd]** [VAR-LINK], and select PV in the finance folder. Press **[ENTER]**. The edit line displays finance\PV.

Press **[ENTER]** and the cell displays 12.

## Example 3

1. On the edit line of cell A1, enter finance\PV. Do not precede the entry with =. Press **[ENTER]**.

2. Go to the Home screen by pressing **HOME** (TI-89), **HOME** (TI-92 Plus), or **CALC HOME** (Voyage™ 200 PLT).
3. On the Home screen, change the value of PV from 12 to 14 by entering 14 **STO▶** finance\pv and pressing **ENTER**.
4. Press **2nd** **↵** to return to the CellSheet™ App. Notice that the value in cell A1 has remained as 12.

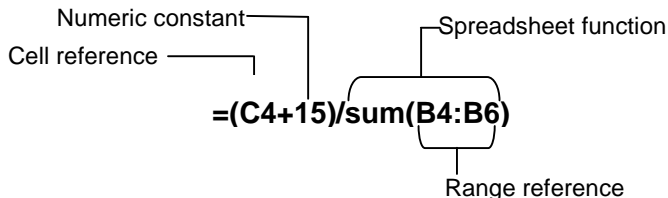
# Formulas

A formula is an equation that performs operations on spreadsheet data. Formulas can:

- Perform mathematical operations, such as addition and multiplication
- Refer to other cells in the same spreadsheet

When you enter a formula, the formula and the evaluation of the formula are both saved in the cell.

The following example adds 15 to the value in cell C4 and then divides the result by the sum of the values in cells B4, B5, and B6.



Always precede a formula with = or + so the formula is saved to that cell and values can be recalculated as variable values change. Formulas in cells are re-evaluated after changes are made in other cells and upon returning to the CellSheet™ App.





**Note**

If a formula references a blank cell directly (e.g., =A1+2), the cell is treated as a 0 (zero). If a formula references a blank cell as part of a range (e.g., =sum(A1:A3)), the blank cell is ignored.

If [AutoCalc](#) is set to **YES**, the spreadsheet is automatically recalculated as you enter or edit data in the spreadsheet.

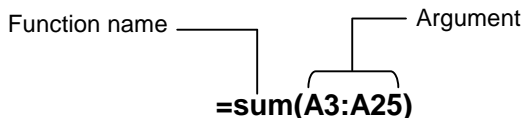
**Tip**

You may want to [turn off the AutoCalc feature](#) if your spreadsheet is large. Large spreadsheets can take a minute or more to recalculate.

When a cell is selected, its formula appears on the edit line, and the formula value appears in the cell. To view formula values in the edit line, press  **I** (TI-89) or  **F** to display the **FORMATS** dialog box. Select **Show:2:Value**. The cell displays the formula value. Pressing  returns the edit line to edit mode and the formula displays on the edit line. Press  **9:Show Pretty Print** to display in a pop-up box cell values that are larger than can be displayed in a cell.

# Functions

A function is a predefined command that performs calculations by using specific values in a particular order. The values are called arguments. The arguments can be numbers, lists, cell names, cell ranges, etc., depending on what the function requires. The arguments are enclosed in parentheses, and a comma separates the arguments.



If **F1** **9:Format** is set to show formulas, functions from CellSheet™ App menus, the Catalog, or calculator keys display on the edit line.

You can use any function on the calculator in a cell, as long as the end result is an expression.

## Example

The variable  $x$  is not defined in the current folder.

1. In cell A1, enter  $x^2+5x$ .
2. In cell A2, enter  $=\text{2nd} [a] (a1,x)$ . Cell A2 displays  $2x+5$ , which is the derivative of the function in cell A1, with respect to  $x$ .

Commands with multiple outputs are not allowed in cells and display as the word “Error” in the cell.

## Entering a function

- If a function's argument is a list, a cell range is also a valid argument.
- If a function's argument is a value, a cell name is also a valid argument.
- When a function is not used as part of a formula, only the resulting value of the function is saved in the cell.

To enter a function:

1. Press  $\square$ , if you want the function to be re-evaluated.
2. Press  $\square$   $\square$  (TI-89) or  $\square$  to display a list of some commonly used spreadsheet functions and select the function.  
— or —  
Select a function from the Catalog or Math menu.  
— or —  
Press a function key.
3. Enter the argument(s) for the function, and then press  $\square$ .

The following section describes the functions available from the  $\square$  **Funcs** menu.

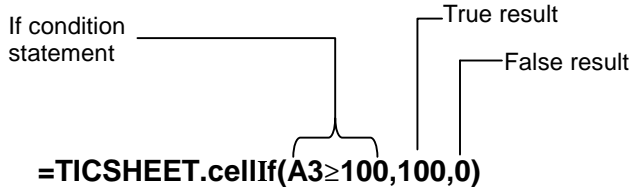


## The cellIf( Function

The cellIf( function returns *trueResult* or *falseResult*, depending on whether the condition is true or false.

**TICSHEET.cellIf**(*condition*, *trueResult*,  
*falseResult*) $\Rightarrow$ *expression*

For example:



Press **[2nd] [F6]** (TI-89) or **[F6] 1:cellIf**(.

The cell If condition, *trueResult*, and *falseResult* may contain cell references.

## The count( Function

The count( function counts how many cells in a range contain expressions. It does not count cells that contain strings. Its syntax is:

**TICSHEET.count(range)⇒expression**

### Notes

- TICSHEET stands for TI CellSheet™ and is the internal software name of the App.
  - The list may be entered as a cell range.
1. Enter 1 in cell A1, 2 in cell A2, and go to cell A4.
  2. Press **[2nd] [F6]** (TI-89) or **[F6]** **2:count(**. The edit line displays TICSHEET.count(.
  3. Type a1:a3) and press **[ENTER]**. The number 2 displays in cell A4 because two cells (A1 and A2) in the range contain data.

## **The mean( function**

The mean( function returns the average of a list. When used in the CellSheet™ App, you may enter either a list or a cell range as the argument.

## **The rand( function**

The rand( function returns a randomly generated number. In the CellSheet App, you may enter a cell containing an integer as an argument.

## **The sum( function**

The sum( function returns the sum of the elements of a list. In the CellSheet App, you may enter either a list or a cell range as the argument.

# Editing Data

You can access the following directly from within the CellSheet™ App:

- CellSheet App menus by pressing the appropriate function keys
- The Catalog and other menus by pressing the appropriate keys

Edit a cell by selecting it and entering the new data. **CLEAR** deletes the contents of a single cell or a range of cells. **F4** allows you to undo the last action.





**Tip** If you have not yet pressed **ENTER** to change a cell's contents, you can press **ESC** to revert to the cell's previous contents.

## Using cut, copy, and paste

1. Select the cell or range of cells you want to cut or copy.

**Tip** Hold **↑** and press the arrow keys to select a range of cells, or use **F3 2:Select Range**.


2. Press one of the following key combinations to cut or copy.
  - Cut: **◆** [CUT] (TI-89) or **◆** X (TI-92 Plus / Voyage™ 200 PLT)

- Copy:  [COPY] (TI-89) or  C (TI-92 Plus / Voyage™ 200 PLT)
- 3. Select the individual cell, the top left cell in a range, or the entire range where you want to paste the information.
- 4. Press  [PASTE] (TI-89) or  V (TI-92 Plus / Voyage 200 PLT).

### Notes

- When cutting and pasting a range of cells, you must paste to a range of the same size.
- You may paste a single cell to a cell range. If the copied cell contains a formula with a cell reference, the cell reference will be adjusted throughout the range.
- If the material to be pasted is from another application, you must be on the edit line to paste.
- Use the CellSheet™ computer-based utility to copy or cut something from one spreadsheet and then paste it into another spreadsheet.

### Undo an edit

Press  to undo only the last edit. Any changes made before the last edit cannot be undone. Certain edits, such as Clear Sheet, cannot be undone.

# Going Beyond the Basics

## Absolute references

If you do not want a cell reference to be changed when you copy or move a formula to a different cell, use an absolute reference. (Relative references are updated when the cell is copied or cut and pasted into a new location.) You can enter the following types of absolute references:

Reference	Description
\$A\$1	Absolute column and absolute row
\$A1	Absolute column and relative row
A\$1	Relative column and absolute row

To enter an absolute cell reference, press **[F5]** to place a dollar sign (\$) on the edit line.

## Specifying units

1. On the edit line, enter a value.
2. Press **[2nd] [UNITS]** (TI-89) or **[◆] [UNITS]**.

3. Select the desired unit and press **[ENTER]**.
4. Press **[ENTER]** to place the value in the spreadsheet.

The value is converted and displayed automatically in the current default unit for that category. For example, if your default unit system is set to SI (scientific) and you enter 2\_cm, the CellSheet™ App will return .02\*\_m. To maintain units other than the default, follow the entry with the conversion operator (►) and the units you want.

### **Grabbing a cell reference**

Grabbing a cell reference copies a cell name onto the edit line. While editing or entering information, press **[STO►]**. Use the arrow keys to move the cursor to the cell whose reference you would like to enter into the formula. Press **[ENTER]**.

### **Grabbing a range reference**

Grabbing a range reference copies a range of cells onto the edit line. While editing or entering information, press **[STO►]**. Use the arrow keys to move the cursor to the first cell in a range you want to reference. Press and hold **[↑]** while pressing the arrow keys until the range is selected. Press **[ENTER]**, and the range is entered into the formula or function.

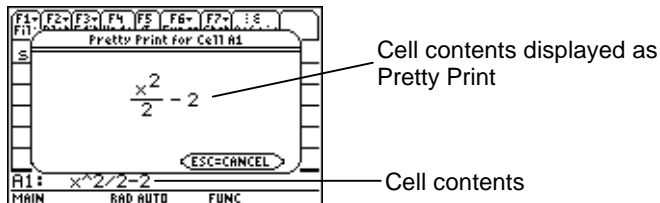
## Example

1. Enter 5 in cell A1, 6 in cell A2, and 7 in cell A3.
2. In cell A4, determine the sum of A1:A3 by pressing  $\boxed{2\text{nd}} \boxed{[F6]}$  (TI-89) or  $\boxed{[F6]} \mathbf{5:\text{sum}(}$ .
3. Press  $\boxed{[STO] \blacktriangleright}$  and then select A1:A3 by pressing  $\boxed{\uparrow}$  and the appropriate arrow keys. Press  $\boxed{[ENTER]}$ .
4. Press  $\boxed{]}$ . The edit line should look like this: **sum(A1:A3)**.

## Displaying in Pretty Print

Pretty Print displays expressions in the same form in which they are written on the board or in textbooks.

To display the value of a cell in Pretty Print, select the cell and press  $\boxed{[F3]} \mathbf{9:\text{Show Pretty Print}}$ .





## Filling a range

You can fill an entire range of cells with a formula or other data at the same time. Note that if you fill a range with a formula, any cell reference in the formula is automatically updated, unless it has been assigned an [absolute reference](#).

1. Select the range that you would like to fill.
2. Press **F3** **3:Fill Range** and enter the data for the top left cell of the range. If you want to fill the range with a formula, make sure to leave = in the Initial Formula field. If not, delete = before entering the data for the range you wish to fill.

It is necessary to use a formula if you need to refer to a cell updated over a range. If you omit the =, the cell reference is evaluated for the first cell in the range, and this value is used throughout the range.

3. Press **ENTER** **ENTER**.

If you are filling a range with a formula, the application may take some time to fill the range and then evaluate the formulas. To save time, press **F1** **9:Format** and turn off [AutoCalc](#). With AutoCalc turned off, cells with formulas containing references to other cells do not recalculate when you make changes to the referred cells.

## Entering a sequence

Sequence increments a variable from a low value through a high value by step increments, evaluates the expression for each value, and returns the results in a range of cells. The upper left cell, designated by 1st cell, contains the first element of the sequence. The other elements of the sequence extend through the row or column based on the direction you choose, down or right.

1. Select the cell where you want to begin the sequence and press **F3** **4:Sequence**.
2. Type an expression and specify the variable in the expression to be incremented.
3. Type the low and high values of the variable.
4. Type the step increment. The default increment is 1.

5. Type the location of the first cell where the sequence is to begin, if it is different from the cell you previously selected.
6. Choose **1:DOWN** or **2:RIGHT** for the direction of the sequence on the spreadsheet.
7. Press .

For more information about using a sequence, see the [linear regression](#) or [maximum area](#) example.

# Importing and Exporting Data

## Importing

You can import data variables, expressions, lists, matrices, and strings.

1. Press **[F3]** **5:Import**.
2. Select the type of data you want to import, the name of the folder, and the variable name.
3. Type in the cell where you want to place the imported information. If you are importing a data variable, list, or matrix, the first cell will be the top left cell of the range you are importing to.
4. For a list, choose **1:DOWN** or **2:RIGHT** for the display direction.
5. Press **[ENTER]**.

## Exporting

You can export data variables, expressions, lists, and matrices.

1. Select the cell or range of cells you want to export. Press **F3** **6:Export**.
2. Select the type of data and name of the destination folder.
3. Type the name of the variable to be stored.
4. If necessary, edit the cell or range of cells you want to export. Press **ENTER**.

**Note** ■ You cannot export blank cells in expressions, lists, or matrices. ■

# Plotting Data

Plot types and marks are the same as those used by other Apps such as the Data/Matrix Editor. Plots share the Graph screen with other plots and functions and are displayed using the same algorithms. Plots are automatically saved as lists and are automatically updated if you change the values in the spreadsheet.

If you create a plot using a spreadsheet and then open a new spreadsheet, your previous plot data are visible in Plot Setup as list variables rather than range references. This is so the new spreadsheet will not overwrite the previous plot definitions.

## Defining a plot

1. Press **[F2]** **1:Plot Setup**.
2. Select the plot number that you want to define and press **[F1]**.
3. Specify applicable settings for the active items in the Define Plot dialog box. You can input a range or a list in the xRange, yRange, Frequency, and Category fields.
4. Press **[ENTER]**.

Field Name	Description
Plot Type	Select one of the following: <ul style="list-style-type: none"> <li>• Scatter</li> <li>• xyline</li> <li>• Box Plot</li> <li>• Histogram</li> <li>• Modified Box Plot</li> </ul>
Mark	Select the symbol used to plot the data points: Box (□), Cross (x), Plus (+), Square (■), or Dot (.).
xRange	Type the range for x values, the independent variable.
yRange	Type the range for y values, the dependent variable.
Hist. Bucket Width	Specify the width of each bar in a histogram. The default is 1.
Use Freq and Categories?	Select NO or YES. Note that Freq, Category, and Include Categories are active only when Use Freq and Categories? is set to YES. Freq is active only when Plot Type is set to Box Plot or Histogram.

Field Name	Description
Freq	Type the range of cells that contains a weight value for each data point. If you do not enter a range, all data points are assumed to have the same weight (1).
Category	Type the range of cells that contains a category value for each data point.
Include Categories	If you specify a Category, you can use this item to limit the calculation to specified category values.

## Graphing a plot

You can graph any defined plot by selecting the plot and pressing **[F5]** or by selecting the Graph App on your unit.



## Selecting or deselecting a plot

From Plot Setup, select the plot and press **[F4]** to toggle it on or off. Deselect a plot to prevent it from graphing.

## Copying a plot definition

1. From Plot Setup, select the plot and press **[F2]**.





2. Press  and select the plot number to which you want to paste. This is the destination plot.
3. Press .

## Clearing a plot definition

From Plot Setup, highlight the plot and press .

## Turning plots and functions off

-  **2:PlotsOff** turns off all stat plots and spreadsheet plots.
-  **3:FnOff** turns off all function graphs.

# Using Statistics

**Warning** If you are in split screen mode and calculate statistics using the CellSheet™ App and then switch screens to calculate a one-variable statistic with the Data/Matrix Editor, an internal error may appear. An internal error means you will have to reset your calculator. Avoid this error in the Data/Matrix Editor by changing the Calculation Type from OneVar to TwoVar and then back to OneVar.

All of the statistical calculations available in the Data/Matrix Editor are also available in the CellSheet App. You can also use the stat variables stored as system variables.

1. Select a range of cells for analysis.
2. Press **[2nd] [F7]** (TI-89) or **[F7] 1:Calculate**.
3. Include all necessary information for the type of statistical analysis you want. Edit the ranges for the x and y values, frequency, and category data as needed.
4. Press **[ENTER]**.

**[2nd] [F7]** (TI-89) or **[F7] 2:Show Stats** displays the statistics you just generated.

**2nd** [F7] (TI-89) or **F7** **3:Variables** inserts the value of a particular statistical variable into the selected cell.

**Note**

Since the CellSheet™ App shares statistics variables with other applications, it is not advisable to use them in formulas. If you wish to save a particular statistics variable, a better option would be to paste it into a non-formula cell.

# Sorting Data

You can sort columns of data whose cells contain numbers or text. If any cell in the range to be sorted contains formulas, the range cannot be sorted. You can [export](#) a range containing formulas as a list or matrix, then [import](#) the data that now contains no formulas, and then sort the imported range.

## Sorting data in a column or row

1. Select the range of cells to be sorted.
2. Press **[F3] 7:Sort** and select **1:Ascending** or **2:Descending** order.
3. Press **[ENTER]**.

## Sorting by key column

Sometimes columns along the same row contain related information, such as a student's first name, last name, and test scores. In such a case, sorting only a single column would destroy the relationship between the columns. You can sort by key column to keep that relationship. All columns must have the same length.

## Example

Sort a grade sheet by last name.

1. Enter the information as shown.

F1 File	F2 Plot	F3 Edit	F4 Undo	F5 %	F6 Funcs	F7 Stat	F8 ReCalc	
s01	A		B		C		D	
1	Jones			78				
2	Miller			95				
3	Smith			87				
4	Crouse			65				
5								
A1: "Jones"								
MAIN RAD AUTO FUNC								

2. Select the entire range of cells (A1:B4).
3. Press **[F3] 7:Sort**.
4. For Order, select **3:Asc by Key**.
5. For the Key Col, enter A. Press **[ENTER] [ENTER]**.

F1 File	F2 Plot	F3 Edit	F4 Undo	F5 %	F6 Funcs	F7 Stat	F8 ReCalc	
s01	A		B		C		D	
1	Crouse			65				
2	Jones			78				
3	Miller			95				
4	Smith			87				
5								
A1:B4								
MAIN RAD AUTO FUNC								

# Formatting

Format information is retained after the CellSheet™ App is closed.

## Formatting an entire spreadsheet

To format the entire spreadsheet, press **[F1] 9:Format** and then change any of the following settings in the FORMATS dialog box. The changes apply only to the current spreadsheet.

Field Name	Description	Default Setting
<a href="#">AutoCalc</a>	<p>Automatically recalculates the entire spreadsheet as you work.</p> <p>Select 1:YES or 2:NO.</p> <p>Note: When <a href="#">AutoCalc</a> is set to NO, cells with new formulas that you create will display a value determined using the current values in the other cells. Because the current cell is the only one that is evaluated, other cells may be incorrect.</p>	YES

Field Name	Description	Default Setting
Cursor Mvmt	Controls the direction that the cursor moves after you press <b>[ENTER]</b> on the edit line.  Select 1:DOWN, 2:RIGHT, or 3:OFF.	DOWN
Show	Controls what information is displayed on the edit line – formulas or resultant values. If you have chosen to show values and a selected cell contains a formula, the formula displays on the edit line when you press <b>[ENTER]</b> so that you can edit it.  Select 1:FORMULA or 2:VALUE.	FORMULA

## Formatting a column

Formatting selected columns changes the way that data is viewed. Press **[F3] 8:Column Format**, and then change any of the following settings in the COLUMN FORMAT dialog box. Changes apply only to the current spreadsheet.

Field Name	Description	Default Setting
Column	The column you wish to format.	The column(s) currently selected

<b>Field Name</b>	<b>Description</b>	<b>Default Setting</b>
Display Digits	Determines how many digits, up to 12, are displayed in the column. The default is FLOAT 6, which means that results are rounded to a maximum of six digits. Changing the mode screen setting does not affect data displayed in the CellSheet™ App.	FLOAT 6
Col Width	Determines how many characters are displayed in the column's cells. You can view 1 to 12 characters in a cell.	6
Justification	Choose 1:DEFAULT, 2:LEFT, or 3:RIGHT.	Numeric values are right-justified in the cell; text is left-justified.



## Blank Cells

If a blank cell is referenced directly in a formula, it is treated as a 0 (zero). For example, if A1 is blank and A2 contains the formula  $=A1 \times 2$ , A2 will evaluate to 0 (zero). If a range of cells contains a blank cell, the blank cell is ignored in calculations.

### Example

1. Leave cell A1 blank. Enter 3 in A2 and 1 in A3.
2. In A4, enter  $=\text{mean}(A1:A3)$ . A4 evaluates to 2.

# Archiving Spreadsheets

You cannot change cell entries or format settings in an archived spreadsheet.

1. Exit the CellSheet™ App.
2. Press **[2nd] [VAR-LINK]** and select the spreadsheet to be archived.
3. Press **[F1] 8:Archive Variable**.

## Note

Archived and locked spreadsheets can be opened for viewing purposes only. Only unarchived/unlocked spreadsheets can be opened for editing.

# Key Shortcuts

Press **[F1]** **B:Help** for a help screen showing navigation, selecting, and editing key shortcuts.









To...	Do this...
Enter a value or symbolic expression in a cell	<ol style="list-style-type: none"><li>1. Enter a value or symbolic expression.</li><li>2. Press <b>[ENTER]</b>.</li></ol>
Enter a formula in a cell	<ol style="list-style-type: none"><li>1. From a selected cell, press <b>[=]</b> if you need the cell content to be updated.</li><li>2. Type the formula.</li><li>3. Press <b>[ENTER]</b>.</li></ol>
Enter a string (text) in a cell	<ol style="list-style-type: none"><li>1. While in a cell, press <b>[2nd] ["]</b>.</li><li>2. Type the string (text).</li><li>3. Press <b>[2nd] ["]</b>.</li><li>4. Press <b>[ENTER]</b>.</li></ol>

To...	Do this...
<p><b>Use a variable in a cell</b></p>	<ol style="list-style-type: none"> <li>From outside the application, store a value to a variable. (Example: 5 <b>STO▶</b> x)</li> <li>In the application, type the variable (such as x). Do not surround the variable with quotation marks. If the variable has the same name as a cell or if it is in a different folder, include the path name. <b>Tip:</b> Type = or + before the variable if you would like the value in the cell to change when the variable's value changes.</li> <li>Press <b>ENTER</b>. The variable's value appears in the cell.</li> </ol>
<p><b>Navigate rapidly in a spreadsheet</b></p>	<ul style="list-style-type: none"> <li><b>←</b>, <b>→</b>, <b>↶</b>, or <b>↷</b> moves the cursor from the current cell to an adjacent cell.</li> <li><b>↶</b> <b>←</b> or <b>↶</b> <b>→</b> moves the cursor to the first or last cell in a column.</li> <li><b>↶</b> <b>↓</b> or <b>↶</b> <b>↑</b> moves the cursor to the first or last cell in a row.</li> <li><b>2nd</b> <b>↶</b> or <b>2nd</b> <b>↷</b> moves the cursor several rows up or down.</li> <li><b>2nd</b> <b>↓</b> or <b>2nd</b> <b>↑</b> moves the cursor several columns to the right or left.</li> <li><b>F3 1:GoTo</b> moves the cursor to the cell you indicate.</li> </ul> <p><b>Note:</b> For the TI-89 only, press <b>alpha</b> in the CellSheet™ App dialog boxes before typing alpha characters.</p>

To...	Do this...
<b>Select a range of cells</b>	<ol style="list-style-type: none"> <li data-bbox="422 101 1080 158">1. In a cell, press and hold <b>[↑]</b> while pressing <b>[←]</b>, <b>[↓]</b>, <b>[→]</b>, or <b>[↵]</b>.</li> <li data-bbox="422 169 609 196">2. Release <b>[↑]</b>.</li> </ol> <p data-bbox="422 207 1051 360"><b>Tip:</b> For a large range, it might be faster to use <b>[F3] 2:Select Range</b>. In the dialog box, type the column/row of the beginning and end of the range and press <b>[ENTER]</b> (Example: a6:m53). Press <b>[↓]</b> or <b>[ESC]</b> to deselect the range.</p>
<b>Select one or more rows</b>	<ol style="list-style-type: none"> <li data-bbox="422 382 971 408">1. Press <b>[↕] [↓]</b> to go to the first cell in the row.</li> <li data-bbox="422 420 778 446">2. Press <b>[↓]</b> to select the row.</li> <li data-bbox="422 458 963 484">3. Press and hold <b>[↑]</b> while pressing <b>[←]</b> or <b>[→]</b>.</li> <li data-bbox="422 495 609 522">4. Release <b>[↑]</b>.</li> </ol> <p data-bbox="422 533 835 560"><b>Tip:</b> Press <b>[↓]</b> to deselect the range.</p>
<b>Select one or more columns</b>	<ol style="list-style-type: none"> <li data-bbox="422 574 1017 600">1. Press <b>[↔] [←]</b> to go to the first cell in the column.</li> <li data-bbox="422 611 824 638">2. Press <b>[←]</b> to select the column.</li> <li data-bbox="422 649 956 676">3. Press and hold <b>[↑]</b> while pressing <b>[↓]</b> or <b>[↑]</b>.</li> <li data-bbox="422 687 609 714">4. Release <b>[↑]</b>.</li> </ol> <p data-bbox="422 725 839 751"><b>Tip:</b> Press <b>[→]</b> to deselect the range.</p>
<b>Insert a cell</b>	<ol style="list-style-type: none"> <li data-bbox="422 765 621 792">1. Select a cell.</li> <li data-bbox="422 803 1040 860">2. Press <b>[2nd] [INS]</b> to insert a cell above the selected cell.</li> </ol>
<b>Insert a row</b>	<ol style="list-style-type: none"> <li data-bbox="422 880 632 906">1. Select a row.</li> <li data-bbox="422 918 1051 975">2. Press <b>[2nd] [INS]</b> to insert a row above the selected row.</li> </ol> <p data-bbox="422 987 787 1013"><b>Tip:</b> Press <b>[↓]</b> to deselect a row.</p>

To...	Do this...
<b>Insert a column</b>	<ol style="list-style-type: none"> <li>1. Select a column.</li> <li>2. Press <b>2nd</b> [INS] to insert a column to the left of the selected column.</li> </ol> <p><b>Tip:</b> Press <b>⊖</b> to deselect a column.</p>
<b>Delete a cell</b>	<ol style="list-style-type: none"> <li>1. Select one or more cells.</li> <li>2. Press <b>←</b> or <b>↓</b> [DEL]. Cells below the deleted area move up by the number of cells deleted.</li> </ol>
<b>Delete a row</b>	<ol style="list-style-type: none"> <li>1. Select one or more rows.</li> <li>2. Press <b>←</b> or <b>↓</b> [DEL]. Rows below the deleted area move up by the number of rows deleted.</li> </ol>
<b>Delete a column</b>	<ol style="list-style-type: none"> <li>1. Select one or more columns.</li> <li>2. Press <b>←</b> or <b>↓</b> [DEL]. Columns to the right of the deleted area move to the left by the number of columns deleted.</li> </ol>
<b>Clear data without deleting the cell, row, or column</b>	<ol style="list-style-type: none"> <li>1. Select one or more cells, rows, or columns.</li> <li>2. Press <b>CLEAR</b>.</li> </ol>

To...	Do this...
<b>Cut, copy, and paste</b>	<p>To cut:</p> <ol style="list-style-type: none"><li>1. Select one or more cells.</li><li>2. Press: TI-89:  [CUT] TI-92 Plus / Voyage™ 200 PLT:  X</li></ol> <p>To copy:</p> <ol style="list-style-type: none"><li>1. Select one or more cells.</li><li>2. Press: TI-89:  [COPY] TI-92 Plus / Voyage 200 PLT:  C</li></ol> <p>To paste:</p> <ol style="list-style-type: none"><li>1. Select one or more cells.</li><li>2. Press: TI-89:  [PASTE] TI-92 Plus / Voyage 200 PLT:  V</li></ol> <p><b>Note:</b> If you are pasting to a range, the destination range must have the same dimensions as the cut or copied range.</p>

To...	Do this...
<b>Quick fill</b>	<ol style="list-style-type: none"> <li>1. Select a cell that contains information.</li> <li>2. Press: TI-89:  [COPY] TI-92 Plus / Voyage™ 200 PLT:  C</li> <li>3. Select a range of cells.</li> <li>4. Paste the copied information: TI-89:  [PASTE] TI-92 Plus / Voyage 200 PLT:  V.</li> </ol> <p><b>Note:</b> Cell references in formulas are updated in the pasted range. You can also use  <b>3:Fill Range</b>.</p>
<b>Grab a cell reference</b>	<ol style="list-style-type: none"> <li>1. While editing or entering a formula or function, press .</li> <li>2. Use the arrow keys to move the cursor to the cell whose reference you would like to enter into the formula.</li> <li>3. Press .</li> </ol>
<b>Grab a range reference</b>	<ol style="list-style-type: none"> <li>1. While editing or entering a formula, press .</li> <li>2. Use the arrow keys to move the cursor to the first cell in a range you want to reference.</li> <li>3. Press and hold  while pressing the arrow keys until the range is selected.</li> <li>4. Press .</li> </ol>
<b>Change format settings for an entire spreadsheet</b>	<p>Press   (TI-89) or  F to display the FORMATS dialog box.</p>



## Example — Interest and Principal Paid

Margaret used her QuickCash credit card to purchase a \$1500 item. QuickCash charges 1.5 percent interest that is compounded monthly. The required minimum monthly payment is 3 percent of the balance. Assuming that Margaret makes the minimum monthly payment, how much interest and principal will she have paid in six months?

- ▶ [Start](#) the CellSheet™ App and change column settings to show money entries.
  1. [Select](#) columns A, B, and C.
  2. Press **[F3]** **8:Column Format**. Select **FIX 2** for display digits and change the column width to 7.

► Enter these column headings:

P = principal  
I = interest accrued  
PY = minimum monthly payment

1. With the cursor in cell A1, enter the principal column heading, P (2nd ["] P 2nd ["]).
2. Move the cursor to cell B1, and enter the interest accrued column heading, I (2nd ["] I 2nd ["]).
3. Move the cursor to cell C1, and enter the minimum monthly payment column heading, PY (2nd ["] PY 2nd ["]).  
Your spreadsheet should look like this:

F1- File	F2- Plot	F3- Edit	F4- Undo	F5- ⌘	F6- Funcs	F7- Stat	F8- ReCalc	
⊞01	A			B			C	
1	P			I			PY	
2								
3								
4								
5								
C2: MAIN                      RAD AUTO                      FUNC								

- ▶ Enter the initial data for the spreadsheet in cells A2, B2, and C2:





$$P = 1500.$$

$$I = .015 \times P$$

$$PY = .03 \times P$$





1. Move the cursor to cell A2, and enter 1500. (**1500.** ENTER)
2. Move the cursor to cell B2, and enter the interest formula as =A2 x .015 (use the multiplication key, not an x).
3. Move the cursor to cell C2, and enter the payment formula as = A2 x .03. Your spreadsheet should look like this:

F1- File	F2- Plot	F3- Edit	F4 Undo	F5 ↔	F6- Funcs	F7- Stat	F8 ReCalc	
⊞01	A		B		C			
1	P		I		PV			
2	1500.00		22.50		45.00			
3								
4								
5								
C3:								
MAIN			RAD AUTO			FUNC		

- ▶ At the beginning of each month, the new principal is calculated using the formula  $P_2 = P_1 - (PY - I)$ . The interest accrued and minimum monthly payment are calculated exactly as they were for the first month.
  1. Move the cursor to cell A3, and enter the formula for the new principal amount as  $=A2-(C2-B2)$ .
  2. To copy the formulas from B2:C2 to B3:C3, [select B2:C2](#) and press  [COPY] (TI-89) or  C.
  3. Select B3, and then press  [PASTE] (TI-89) or  V to paste the formula from this range of cells. Your spreadsheet should look like this:

Notice that the relative reference to A2 automatically changes to A3.

F1- File	F2- Plot	F3- Edit	F4 Undo	F5 \$	F6- Funcs	F7- Stat	F8 ReCalc	
01	A			B			C	
1	P			I			PY	
2	1500.00			22.50			45.00	
3	1477.50			22.16			44.33	
4								
5								
B3: =A3*.015								
MAIN		RAD AUTO			FUNC			

- Enter the data for the remaining four months by copying the formulas from A3:C3 to rows 4 through 7.
1. Select A3:C3 and press  [COPY] (TI-89) or  C to copy the formulas from A3:C3.
  2. Move the cursor to cell A4, and then press  [PASTE] (TI-89) or  V to paste the formulas into A4:C4.
  3. Paste the formulas to A5:C5, A6:C6, and A7:C7. Your spreadsheet should look like this:

F1 F1/x	F2 F2/x	F3 F3/x	F4 F4/x	F5 F5/x	F6 F6/x	F7 F7/x	F8 F8/x
File	Plot	Edit	Undo	3	Funcs	Stat	Recalc
01	A		B		C		
1	P		I		PV		
2	1500.00		22.50		45.00		
3	1477.50		22.16		44.33		
4	1455.34		21.83		43.66		
5	1433.51		21.50		43.01		
A5: =A4-(C4-B4)							
MAIN		RAD AUTO		FUNC			

- Find the amount of principal left to be paid after six payments have been made.

Move the cursor to cell A7, copy the formula, and paste it in cell A8. Your spreadsheet should look like this:

F1- File	F2- Plot	F3- Edit	F4- Undo	F5- \$	F6- Funcs	F7- Stat	F8- ReCalc	
int	A			B			C	
4	1455.34			21.83			43.66	
5	1433.51			21.50			43.01	
6	1412.00			21.18			42.36	
7	1390.82			20.86			41.72	
8	1369.96							
A8: =A7-(C7-B7)								
MIN RAD AUTO FUNC								

- ▶ Using the following formulas, calculate how much interest and principal Margaret will have paid after six months.

Total principal paid = 1500.00–A8.

Total interest paid = the sum of B2 through B7 (=sum(B2:B7)).

Total of the payments made = the sum of C2 through C7  
(=sum(C2:C7)).

1. Move the cursor to cell A9 and enter the formula for the total principal paid as =A2–A8.
2. Move the cursor to B9 and press  $\boxed{=}$ .
3. Press  $\boxed{2nd}$   $\boxed{[F6]}$  (TI-89) or  $\boxed{[F6]}$  5:sum(.
4. To put B2:B7 on the edit line, press  $\boxed{[STO] \blacktriangleright}$ , select B2:B7, and press  $\boxed{[ENTER]}$ . Press  $\boxed{)}$  to complete the formula and then press  $\boxed{[ENTER]}$ .

5. Move the cursor to cell B9, copy the formula, and paste it in cell C9. Your spreadsheet should look like this:

F1 F11	F2 F12	F3 F13	F4 F14	F5 F15	F6 F16	F7 F17	F8 F18
int	A		B		C		
6	1412.00		21.18		42.36		
7	1390.82		20.86		41.72		
8	1369.96						
9	130.04		130.04		260.08		
10							
C9: =sum(C2:C7)							
MAIN		RAD AUTO		FUNC			

After 6 months, Margaret will have paid \$260.08, which includes \$130.04 in interest and \$130.04 in principal. She still owes \$1369.96.

To see how many months it will take Margaret to repay the credit card company completely, copy and paste the range A7:C7 down the rows until the amount in column A goes to zero.



## Example — Linear Regression

A survey examined the relationship between the age (in years) and the average height (in centimeters) of a young person.

Age is given by the list {1, 3, 5, 7, 9, 11, 13}.

Average height is given by the list {75, 92, 108, 121, 130, 142, 155}.

- ▶ [Start](#) the CellSheet™ App. Then set up the column headings, and enter the data.
  1. [Enter the column headings](#) **AGE** and **HEIGHT** in cells A1 and B1.
  2. Move the cursor to cell A2.

3. [Use the sequence option](#) (**F3** **4:Sequence**) to enter the list of ages in cells A2 through A8. The Sequence dialog box should look like this:

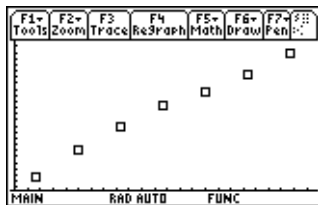


4. [Enter the heights](#) in cells B2 through B8. Your spreadsheet should look like this:

F1	F2	F3	F4	F5	F6	F7	F8
File	Plot	Edit	Undo	3	Funcs	Stat	Rec:::
01	A		B	C	D		
5		7	121				
6		9	130				
7		11	142				
8		13	155				
9							
B9:							
MAIN RAD AUTO FUNC							

- ▶ Plot the data and determine the linear regression correlation.
  1. Select the range A2:B8.
  2. Select **F2** **1:Plot Setup**.

3. **Plot 1** should be highlighted on the Plot Setup screen. Press **[F1]**.
4. Select **Scatter** for the Plot Type.
5. Press **⌵** and select the type of **Mark** you want.
6. The xRange is A2:A8, and the yRange is B2:B8. Press **[ENTER]** **[ENTER]**.
7. On the Plot Setup screen, press **[F5]** to show the graph. The following graph appears. (This graph uses the Box mark.)



8. Press **[2nd]** **[ $\pm$ ]** to return to the spreadsheet.
9. Press **[2nd]** **[F7]** (TI-89) or **[F7]** **1:Calculate**.
10. Select **5:LinReg** for Calculation Type.

11. Press **ENTER**. A correlation of .995588 shows that the data fit a linear regression well.



The closer this number is to 1, the better the data fit a linear regression.

## Example — Maximum Area

Farmer Brown has 60 meters (m) of fencing material. What is the estimated maximum area of rectangular pasture he can enclose?

- ▶ [Start](#) the CellSheet™ App. Then enter 60 m (the amount of fencing material) in cell A1.
  1. On the entry line, type 60.
  2. Press **[2nd] [UNITS]** (TI-89) or **[♦] [UNITS]** and select **\_m** for length.
  3. Press **[ENTER]**.
  
- ▶ Enter the measurements for one side (L1) of the enclosure using the [sequence option](#). Assume that the measurements start at 5 m and go up to 30 m in 5-m increments.
  1. Select cell A2 and press **[F3] 4:Sequence**.
  2. In the dialog box, enter **x [x]** for Expr. Then press **[2nd] [UNITS]** (TI-89) or **[♦] [UNITS]** and select **\_m** for length.

3. Enter the following:

- x for Var
- 5 for Low
- 30 for High
- 5 for Step
- A2 for 1st Cell
- Direction should be DOWN.

4. Press **ENTER**. Your spreadsheet should look like this:

F1 F11	F2 F12	F3 F13	F4 F14	F5 F15	F6 F16	F7 F17	F8 F18
File	Edit	Undo	Find	Funcs	Stat	Rec	...
01	A	B	C	D			
1	60.*_m						
2	5.*_m						
3	10.*_m						
4	15.*_m						
5	20.*_m						
A2:	5.*_m						
MAIN	RAD	AUTO	FUNC				

- ▶ Enter measurements for the other side of the enclosure (L2).  
L2=60/2-L1.

1. In cell B2, enter  $=(\$a\$1 \div 2) - a2$  for the formula for the length.

**Tip**

\$a\$1 means that this particular cell reference will not change, regardless of where it is in the spreadsheet. It is an absolute reference. Press **[F5]** for the \$ sign. The relative reference to cell A2 should update as it fills down to determine the length of the remaining side.

2. Select cell B2 and press **[C]** [COPY] (TI-89) or **[C]** to copy the formula
3. Select B3:B7 and then press **[V]** [PASTE] (TI-89) or **[V]** to paste the formula into the range. Your spreadsheet should look like this:

F1 File	F2 Plot	F3 Edit	F4 : : *	F5 : \$	F6 Funcs	F7 Stat	F8 : : :	F9 : :
⊞	01	A		B		C		D
1	60.*_m							
2	5.*_m	25.*_m						
3	10.*_m	20.*_m						
4	15.*_m	15.*_m						
5	20.*_m	10.*_m						
B1:								
MAIN			RAD AUTO			FUNC		

- Determine the possible areas that can be enclosed with the fencing material.

1. Enter =A2  B2 in cell C2.
2. Copy cell C2 and paste it to C3:C7. Your spreadsheet should look like this:

F1 File	F2 Plot	F3 Edit	F4 Undo	F5 Σ	F6 Funcs	F7 Stat	F8 Recall	F9 : :
≤01	A		B		C		D	
1	60.*_m							
2	5.*_m	25.*_m	125.*...					
3	10.*_m	20.*_m	200.*...					
4	15.*_m	15.*_m	225.*...					
5	20.*_m	10.*_m	200.*...					
C1:								
MAIN			RAD AUTO			FUNC		

Notice that the maximum area for the lengths that we determined ( $225 \text{ m}^2$ ) occurs when the length of the area equals its width. The maximum area to be enclosed would be shaped like a square. What happens if you change cell A1 to 45 m? What happens if you pick a different step size in the sequence?



# Errors, Error Messages, and Restrictions

Message	Description
<b>Action will remove data from spreadsheet. Press Enter to proceed or ESC to abort.</b>	This error message appears when you have data in a far right corner or in a far down row of the spreadsheet and you wish to insert a range that will cause some of the data to move beyond the spreadsheet's 999 rows or 64 columns.
<b>Cannot complete operation due to CellSheet size limitations. Operation aborted.</b>	This occurs when an operation would make the spreadsheet exceed its 64k size limit.
<b>Cannot export. Blank cells or errors in cells.</b>	The CellSheet™ App does not export ranges that contain blank cells or formulas that evaluate to an error.
<b>Cannot paste to a range of different size than original range.</b>	This message appears when you try to paste a range of cells into an area where it cannot fit in its entirety or when you try to paste a range into a different sized range. For example, if you copied A1:B3 and tried to paste to BL1, this error message would appear because there is no column after BL1.
<b>Cannot sort a range containing formulas.</b>	The CellSheet App does not sort ranges that contain formulas.

<b>Message</b>	<b>Description</b>
<b>Cannot use commands in cells.</b>	You cannot enter an instruction in a cell. You can enter functions that return values. Instructions initiate actions.
<b>Circular References. Cannot recalculate properly until circular references are resolved.</b>	This occurs when a cell formula results in a loop, for example when A1 is set to =A1.
<b>Invalid cell or cell range.</b>	This occurs when you enter an invalid cell or range such as A0, BZ12, or A1:A1000 or when you enter a single cell where a range is required. Valid cells are A1 to BL999.
<b>KeyCol not in selected sorting range.</b>	This error appears when the key column is not in the range you have selected to sort.
<b>Memory. Cannot store data. Data item contains too many characters.</b>	This error occurs when you have too many characters in a cell to store, for example an exceptionally long formula. Break up the information into two or more cells.
<b>Problem with Spreadsheet file. Please delete the variable.</b>	<p>The current spreadsheet file variable is corrupted. To correct this problem, delete the variable.</p> <ol style="list-style-type: none"> <li>1. Press <b>[2nd]</b> <b>[VAR-LINK]</b>.</li> <li>2. Select the variable for the current spreadsheet file.</li> <li>3. Press <b>[←]</b> and <b>[ENTER]</b> to delete the variable.</li> </ol>

<b>Message</b>	<b>Description</b>
<b>Spreadsheet cannot maintain excessive references to the same cell. Recalculation canceled.</b>	This occurs when you have referred to a single cell too many times. You can correct this error by making another cell refer to the needed cell and using both cell references in formulas.
<b>Syntax</b>	This occurs when you enter an invalid cell reference (e.g., A0) or if you delete a cell that is referred to by another cell.
<b>Unable to properly update one or more plot definitions.</b>	<p>This error message appears when the app is unable to update a list associated with a plot. Example:</p> <ol style="list-style-type: none"><li>1. Create a plot with the xRange as A1:A3 and the yRange B1:B3.</li><li>2. Return to the spreadsheet, and create an error in A3.</li><li>3. Return to the plot you created. Press <b>F5</b> to graph it.</li></ol> <p>The error message appears.</p>

<b>Message</b>	<b>Description</b>
<b>Variable is locked, protected, or archived. Turning AutoCalc format option off.</b>	<p>The spreadsheet that you are trying to open has been archived or locked, so you cannot make any changes. To unlock or unarchive the spreadsheet:</p> <ol style="list-style-type: none"><li>1. Press <b>[2nd] [QUIT]</b> to exit the app.</li><li>2. Press <b>[2nd] [VAR-LINK]</b>.</li><li>3. Select the archived variable.</li><li>4. Press <b>[F1] 9:Unarchive Variable</b>.</li></ol>

# CellSheet™ App Menu Map

## F1 File

- 1:Open
- 2:Save Sheet As
- 3:New
- 4:Cut
- 5:Copy
- 6:Paste
- 7:(no option available)
- 8:Clear Sheet
- 9:Format
- A:About
- B:Help

## F3 Edit

- 1:GoTo
- 2:Select Range
- 3:Fill Range
- 4:Sequence
- 5:Import
- 6:Export
- 7:Sort
- 8:Column Format
- 9:Show Pretty Print

## F2 Plot

- 1:Plot Setup
- 2:PlotsOff
- 3:FnOn

## F4 Undo

(no menu items)

## **F5 \$**

(no menu items)

## **F7 Stat**

- 1:Calculate
- 2:Show Stats
- 3:Variables ►  
(depends on type of statistical analysis)

## **F6 Funcs**

- 1:cellIf(
- 2:count(
- 3:mean(
- 4:rand(
- 5:sum(

## **F8 ReCalc**

(no menu items)

# Installing the CellSheet™ App

Detailed Flash application installation instructions are available from [education.ti.com/guides](http://education.ti.com/guides).

You will need:

- A TI-89 / TI-92 Plus / Voyage™ 200 PLT with the latest Advanced Mathematics Software Operating System. Download a free copy from [education.ti.com/softwareupdates](http://education.ti.com/softwareupdates).
- A computer using either Microsoft® Windows® or Apple® Macintosh® operating system software.
- A TI-GRAPH LINK™ computer-to-calculator cable, available for purchase from the TI Online Store at [education.ti.com/buy](http://education.ti.com/buy).
- Either TI Connect™ software or TI-GRAPH LINK connectivity software for the TI-89 / TI-92 Plus. Download a free copy from [education.ti.com/softwareupdates](http://education.ti.com/softwareupdates).

# Starting and Quitting the Application

The instructions in this guidebook refer to this Flash application only. For help using this product, refer to the comprehensive guidebook at [education.ti.com/guides](http://education.ti.com/guides).

1. Press **[APPS]** and select **CellSheet**.
2. Select the spreadsheet type from the menu.
  - **Current** returns to the last spreadsheet when you left the CellSheet™ App.
  - **Open** lets you select an existing spreadsheet.
  - **New** creates a new spreadsheet. Select a folder in which to store the spreadsheet. You may accept the default spreadsheet name or overwrite it. Names must be eight characters or fewer.

## Quitting the CellSheet App

Press **[2nd]** **[QUIT]** from any screen.



## Deleting an Application

Deleting an application removes it from the handheld device and increases space for other applications. Before deleting an application, consider storing it on a computer for reinstallation later.

1. [Quit](#) the application.
2. Press **[2nd] [VAR-LINK]** to display the VAR-LINK [ALL] screen.
3. Press **[2nd] [F7]** (TI-89) or **[F7]** to display the list of installed applications.
4. Select the application you want to delete.
5. Press **[F1] 1:Delete**. The VAR-LINK delete confirmation dialog box displays.
6. Press **[ENTER]** to delete the application.

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**Phone:** 1-972-917-8324

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