Quick Click Calc™

Spreadsheet and Business Graphics for the Apple IIGS

Mike Westerfield

Byte Works®, Inc.
4700 Irving Blvd. NW, Suite 207
Albuquerque, NM 87114
(505) 898-8183

Master Set 1.0.0.0

Limited Warranty - Subject to the below stated limitations, Byte Works, Inc. hereby warrants that the programs contained in this unit will load and run on the standard manufacturer's configuration for the computer listed for a period of ninety (90) days from date of purchase. Except for such warranty, this product is supplied on an "as is" basis without warranty as to merchantability or its fitness for any particular purpose. The limits of warranty extend only to the original purchaser.

Neither Byte Works, Inc. nor the authors of this program are liable or responsible to the purchaser and/or user for loss or damage caused, or alleged to be caused, directly or indirectly by this software and its attendant documentation, including (but not limited to) interruption of service, loss of business, or anticipatory profits.

To obtain the warranty offered, the enclosed purchaser registration card must be completed and returned to the Byte Works, Inc. within ten (10) days of purchase.

Important Notice - This is a fully copyrighted work and as such is protected under copyright laws of the United States of America. According to these laws, consumers of copywritten material may make copies for their personal use only. Duplication for any purpose whatsoever would constitute infringement of copyright laws and the offender would be liable to civil damages of up to $50,000 in addition to actual damages, plus criminal penalties of up to one year imprisonment and/or a $10,000 file.

This product is sold for use on a *single computer* at a *single location*. Contact the publisher for information regarding licensing for use at multiple-workstation or multiple-computer installations.

Table of Contents

Chapter 1 – Getting Started with Quick Click Calc

What's in This Book

Like most books that come with a program, this one serves three purposes.

- This book shows you how to install Quick Click Calc on your computer.
- This book shows you how to use Quick Click Calc.
- This book includes a reference section that is a catalog of all of the capabilities of Quick Click Calc.

This section gives you a quick overview of the book, as well as a detailed overview of this chapter. If you read this section carefully, you'll learn what you can safely skip, and what you really need to read. If you're an experienced computer user, you'll end up skipping a lot.

This book is divided into three major sections.

- This chapter tells you how to install Quick Click Calc and how to get help if you need it.
- Chapter 2 is a spreadsheet cookbook. It serves both as a tutorial introduction to the program and its major features, and as a useful set of recipes that you can use as a starting place for your own spreadsheets.
- Chapters 3 and 4 are the reference manual for Quick Click Calc. Chapter 3 describes the desktop interface, including all of the menu commands and the special mouse and keyboard commands you can use in a spreadsheet window. Chapter 4 describes what you can put in a cell. It includes a complete reference to the functions you can use in spreadsheet cells, with lots of examples.

This chapter helps you set up Quick Click Calc. You'll learn how to install Quick Click Calc on your computer, how to back up the disks, and what to do if you have questions or problems.

System Requirements

Quick Click Calc runs on any Apple IIGS computer with 1.125M or more of RAM and at least one floppy disk drive. It requires Apple's System 6.0.1 (not included).

While Quick Click Calc does not require additional hardware, it works well with color monitors, any printer supported by Apple's Print Manager, hard disks, accelerator cards, and networks. Quick Click Calc also works well with The Manager, Seven Hills' multitasking desktop switcher.

▲ **Warning** 3D Logo requires System Disk 6.0.1 or later. If you have an older version of Apple's operating system, you will need to update your operating system.

If you don't have the latest System Disk, and would like to get a copy, check first with your local dealer, your user's group, and any online services you have access to. You may be able to get a copy of the latest System Disks free.

You can purchase a System 6.0.1 boot disk or the complete collection of 6 System 6.0.1 disks from Byte Works.

If all else fails, or if you want to get the complete documentation or release notes, you can buy them from Resource Central.

Resource Central
6339 West 110th
Overland Park, KS 66211
(913) 469-6502 ▲

Backing Up Quick Click Calc

There is one disk that comes with Quick Click Calc. Floppy disks are a very reliable way to store information, but accidents do happen. If your floppy disk gets too hot, or gets too close to a magnet, the program might be partially erased—and if that happens, it needs to be re-recorded. It's also possible you could loose a disk.

Of course, if you need to re-record a disk, you need to have more than one copy. That's what backups are for.

We suggest making one backup copy of your Quick Click Calc disk. You should also have a working copy, generally the one on your hard disk.

If you have a disk copy program you already know how to use, go ahead. The Quick Click Calc disk is not copy protected, so you can copy them with any copy program.

Here's how to make a backup copy from the Finder. The Finder is the program supplied by Apple Computer that shows disks, lets you copy files, and lets you run programs.

- Get into Apple's Finder. One way to do that is to boot Apple’s System Disk.
- Insert a blank floppy disk into the computer. The Finder will ask you to initialize the disk. Initialize it, using the default name of Untitled.
- Eject the disk by pulling down the Disk menu and selecting Eject. The disk has to be selected before you can eject it. If it doesn't eject, click one time on the disk icon to select the disk, then try again.
- Insert the Quick Click Calc disk into the disk drive.

- Drag the disk icon for the Quick Click Calc disk to the disk you just initialized. The Finder will double-check before copying the disk, and will ask you to swap the disks a few times. (Of course, if you have two 3.5 inch floppy disk drives, you can leave both disks in drives and avoid the swapping.)
- Click on the name of the new disk Type the name of the disk you copied, since the name of the disk can be important. Press RETURN to finish naming the disk.
- Eject the new disk by dragging it to the trash can.
- Set the write-protect tab so the disk can't be accidentally erased, and store the disk in a safe place.

Installing Quick Click Calc on a Hard Disk

If you have a hard disk, you will want to install Quick Click Calc on your hard disk. From the hard disk, Quick Click Calc will load and run faster, and will always be available when you need it.

Quick Click Calc is completely self contained. To copy it to a hard disk using Apple's Finder, drag the QCCalc.Sys16 icon from the Quick Click Calc disk to any location in your hard disk. You can also copy the samples and other files, but they are not required to use Quick Click Calc.

Using 3D Logo With Floppy Disks

You can run Quick Click Calc from floppy disks by booting from a System 6.0.1 boot disk, then running Quick Click Calc from a copy of the Quick Click Calc disk. If you have two 3.5" floppy disks, this works fairly well—by leaving the boot disk in your first drive and putting the Quick Click Calc disk in drive 2, you won't have to swap disks, and there will be plenty of work space for your spreadsheets on the Quick Click Calc disk.

If you only have one 3.5" floppy disk, Quick Click Calc will still work, but you will have to swap between the Quick Click Calc disk and the System Disk from time to time.

While Quick Click Calc supports 5.25" floppy disks, these disks don't hold much information compared to 3.5" floppy disks. You can certainly use them for spreadsheets and other data, but these disks won't hold the Quick Click Calc program.

Using Quick Click Calc from a Network

You can install Quick Click Calc on a network using the same procedure that installs Quick Click Calc on a hard disk. Once installed, you can use Quick Click Calc just like you use any other program.

There is one thing you need to be aware of when using Quick Click Calc from a network: Quick Click Calc requires System 6.0.1 or better. If you are running an older version of Apple's system software, you will need to update your system software or boot from floppy disks.

Getting Answers to Questions

Eventually, you may want to talk with others about Quick Click Calc.

If you need technical assistance—anything from a bad disk to not understanding the manual to reporting a bug—you should contact the publisher and ask for technical assistance. The publisher occasionally adds new technical support channels or changes hours or phone numbers. For the latest times, numbers, online services and mailing address, read the file Tech.Support, which you can find on the Program Disk.

If you would like to talk to others about Quick Click Calc, we suggest one of the major online services, like GEnie or America Online. You'll probably find a topic to discuss Quick Click Calc already there, and can join in the discussion. As this manual goes to press, the publisher sponsors discussions on America Online and GEnie. You can join the discussion on America Online using keyword ByteWorks. From GEnie visit with us in topic 45 of A2.

Chapter 2 – The Spreadsheet Cookbook

This chapter is a spreadsheet cookbook. It shows several typical spreadsheets, stepping you through exactly how to set them up.

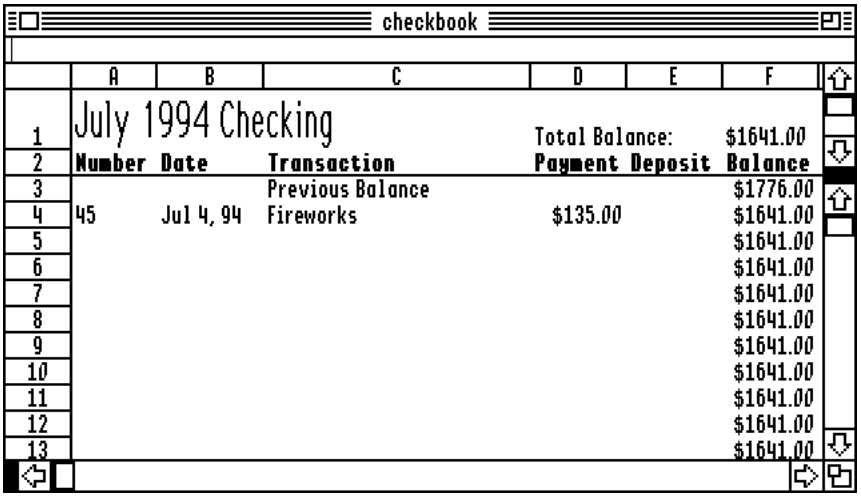
While the spreadsheets in this chapter may not be exactly what you want, each one shows you *exactly* how to create a typical spreadsheet application. You can use this chapter to learn how to put the various ideas in the spreadsheet together in a practical way, or as a jumping-off place, by changing one of the spreadsheets you see here to meet your needs.

All of the spreadsheets you see here are also on your disk. They are in the samples folder. While that may be handy for checking out what one of the samples looks like, you'll learn more about using Quick Click Calc if you create each spreadsheet yourself.

A Simple Checkbook

What it Does

A checkbook has to be about the most typical spreadsheet of all. A checkbook uses all of the basic ideas spreadsheets were created to handle. This recipe creates a simple checkbook—it's a computerized version of the paper check tracking book found at the front of most pocket checkbooks.



Ideas Covered

- Using fonts, colors and borders to jazz up a spreadsheet.
- Creating preformatted, blank columns.
- Changing the size of cells.
- Using simple cell formulas.
- Encrypting files.

The Recipe

	What You Do	Why You Do It
	Step 1: Create the various labels for the spreadsheet and the main columns.	
❑	Pull down File and select New... to open a new spreadsheet.	
❑	Click on cell A1 to select the cell. Type "July 1994 Checking" and press the Enter key.	This creates a title for the spreadsheet.
❑	Select Cell B1 and Type "Number". Press the right-arrow key.	This creates the title for the first column of the checkbook. This is the column where you will enter check numbers. By finishing off with the right-arrow key, you enter the text and move to the next cell with a single keystroke.
❑	Type "Date" and press the right-arrow key.	Enters the second column title. This column will hold the date for a check or deposit.
❑	Type "Transaction" and press the right-arrow key.	Enters the third column title. This is where you will write who the check was written to, or why a deposit was made (i.e., Paycheck).
❑	Type "Payment" and press the right-arrow key.	Enters the fourth column title. This is where you will write the amount of a check.
❑	Type "Deposit" and press the right-arrow key.	Enters the fifth column title. This is where you will write the amount of a deposit.
❑	Type "Balance" and press the Enter key.	Enters the sixth and last column title. This column will contain a formula to automatically calculate the money in the checkbook.

Step 2: Create a line for the checkbook balance before the current month.

- ❑ Select cell C3, right below "Transaction." Type "Previous Balance" and press the Enter key.

  The first line of the checkbook will be used to enter the balance at the start of the month. It won't work quite like any of the other lines in the checkbook, since it doesn't calculate the balance based on a previous value.

- ❑ Select cell F3, right below "Balance," and enter 0.

  This sets up a field for the initial balance. We'll want to preformat this cell and several others, but a cell has to have a value before it can be formatted.

Step 3: Create the model line for a checkbook or deposit entry.

- ❑ Select cell B4, below "Date," and enter a single space. Press the right arrow two times to move to cell D4, and enter another space. Press the right arrow key, enter a space, and press the Enter key to enter a space in cell E4.

  Column B will be formatted as a date, and columns D and E for dollar amounts. Once again, though, we need to enter something in the cell before it can be formatted.

- ❑ Select cell F4 and enter the formula

  =F3+E4-D4

  You can do this largely with the mouse. Type =, then click on cells F3 and E4. Type -, then click on cell D4.

  This formula adjusts the checkbook balance by adding the amount of any deposit and subtracting the amount of any check. The new balance is displayed in cell F4.

  The leading = character tells the spreadsheet that what follows is a formula. This character isn't always required, but it's a convenient habit to use it all the time.

  Clicking on cells to enter the cell name in the formula box is a simple, quick way to enter formulas. Several other shortcuts are explained in Chapter 3.

Step 4: Format the date and dollar fields.

- ❑ Click on cell B4 to select that cell. Pull down Format and select the Cell Attributes... command. Click "Date (Dec 25, 94)," the medium date format, then click OK.

  Column B contains the dates for the various checks. This formats the numbers for the column as dates, so when you enter a date in any of the variety of formats supported by Quick Click Calc, the date will be shown in this format.

- ❑ Press cell D3 and drag to cell F4, selecting the block of cells that will contain dollar amounts. Use the Cell Attributes... command to set the format for these cells to "Dollar."

  On each checkbook line, these cells will contain dollar amounts. This step applies the dollar format option to the columns, so they will be displayed as dollars and cents with a leading $ character.

Step 5: Copy the model check/deposit line to create more check/deposit entries.

- ❑ Select cell A4. Use the scroll bar to scroll down until you can see cell F103. Hold down the shift key and click on cell F103, selecting all of the cells in the range A4:F103.

  Finally, pull down Tools and select Fill Down.

  This copies the first checkbook line you created to a total of 100 lines in the spreadsheet, setting up 100 entries in your monthly checkbook. All of the formatting and formula information is copied to each line. The only visible difference is that column F will be filled with zeros, indicating the overall balance.

Step 6: Create a "Total Balance" field in the top area of the checkbook.

- ❑ Scroll back up to the top of the spreadsheet. Select cell D1 and type "Total Balance:" Press Enter to enter the label.

  This step and the next one copy the balance from the end of the checkbook to the top. Eventually, the top portion will be in a split screen, and won't be moved. Putting the balance at the top helps you keep track of the overall picture while you scroll through check entries.

- ❑ Enter the formula

  =F103

  in cell F1.

Step 7: Format the checkbook.

- ❑ Select cells D1 to F1. Pull down the Format menu and select the Color... command. Pick a text color (I used purple) and click OK.

  This just adds some color.

- ❑ Select cell A1. Pull down the Format menu and select Font... Pick a big, bold font for the title of the spreadsheet. I used 18 point bold Geneva.

  This step and the next couple set up a bold spreadsheet title.

- ❑ Pull down Format and select Color... Choose a color for the title. I used blue.

- ❑ Row 1 is too small for the title. Move the mouse to the bar between the titles for rows 1 and 2, then drag down to enlarge row 1. Make it big enough to hold the title.

  If you need more information about enlarging the cell, see "Changing the Size of Cells" in Chapter 3.

- ❑ Select cells A2 to F2. Use the Font... command to change the cells to bold.

  Bold headers for cell columns stand out well, making the spreadsheet easier to use.

- ❑ With cells A2 to F2 still selected, pull down the Format menu and select Borders... Use this dialog to create a thin black line under these cells, dividing the column titles from the information.

  This dividing line is mostly for printing. The split screen control will eventually cover the line on the computer screen.

- ❑ Pull down Format and select Hide Grid.

  This is a personal preference you may not like, but especially when I print a spreadsheet, I prefer not to have the default grid lines. If you like the spreadsheet better with the grid lines, leave them.

- ❑ Click on the zoom box to expand the window to the full size of the screen. Use the mouse to adjust the width of the various spreadsheet cells to suit you.

  If you have trouble adjusting the cell sizes, see "Changing the Size of Cells" and "Column Width..." in Chapter 3.

  Now that all of the formatting is done, you can see how much room you need for the columns. I personally adjusted all of the columns except C so they were as small as they could be while still allowing me to see all of the column headers. I then adjusted column C to take up all of the remaining room.

- ❑ Make sure the spreadsheet is scrolled to the top, so row A is visible. Drag the split screen control down until the split indicator divides rows 2 and 3.

  This fixes the titles at the top of the spreadsheet, allowing you to scroll through the monthly checking statement and still see the column headers and balance.

Step 8: Encrypt the checkbook.

❑ Pull down File and select Save As... Type in a name and select a location from the file.

Click on "Encrypt the File." You'll see a password dialog. Enter the same password in both LineEdit boxes, then select "OK."

Select "Save" to save the file.

A checkbook is an ideal example of the sort of document you may not want everyone who has access to your computer to see. Using a password locks the file. When you open the file, you'll be asked for the password. Without the password, you cannot open the spreadsheet.

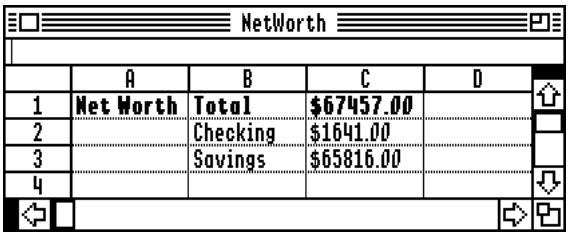
Note: The Checkbook spreadsheet in the Samples folder of your Quick Click Calc disk is not encrypted.

Net Worth

What it Does

The Net Worth spreadsheet is really more of a framework or example than a complete spreadsheet. This spreadsheet takes values from different sources and shows an overall net worth.

The main emphasis in this spreadsheet is to show how Publish and Subscribe work.



Publish and Subscribe

The Net Worth spreadsheet takes a variety of numbers into account. In our simple example, we'll use just two numbers—the balance in your checking and the balance in your passbook savings account. Naturally, a true net worth is more complicated. It includes home equity, outstanding debts, some kinds of life insurance, investments, personal possessions and so forth.

Creating the spreadsheet is really quite easy. All you are doing is creating a table of numbers, then adding all of them together. The interesting thing about this example is where one of the numbers comes from.

In the last recipe, you created a checkbook spreadsheet that calculates your checking account balance. That's one of the numbers that will appear in this spreadsheet. Publish and Subscribe let you create a spreadsheet that automatically grabs cells from another spreadsheet. If you write a check, enter the check in the checkbook and save the new file, then open your Net Worth spreadsheet, the checkbook balance is updated automatically. It even works over networks, so you could put the checkbook spreadsheet on a network server where more than one person can record checks.

To make all of this happen, you use publish and subscribe to create something called an edition. An edition is a scratchpad file, sort of like a scrap in a scrapbook, but it is updated automatically. The *edition* contains the information from a *publisher* spreadsheet; in this case, the Checkbook. The edition is used by a *subscriber* spreadsheet, in this case the Net Worth spreadsheet.

In the recipe that follows, you'll start by turning the Checkbook spreadsheet from the last recipe into a publisher. If you didn't create a checkbook, you can use the one in the Samples folder of the Quick Click Calc disk. The original checkbook is saved as Checkbook. The modified checkbook described here is saved as Checkbook.Pub.

Turning the checkbook into a publisher saves an edition file. Once it's created, the edition is updated by the checkbook spreadsheet any time you save the spreadsheet. You can also force the edition to update using the Edition Options... command, described in Chapter 3.

Once the edition is created, the Net Worth spreadsheet subscribes to the edition. Every time you load the Net Worth spreadsheet, it checks the edition to see if there are changes, updating the published values if they have changed. You can force the editions to update without loading the file using the Edition Options... command.

Ideas Covered

- Publish and Subscribe.
- Using fonts, colors and borders to jazz up a spreadsheet.
- Using simple cell formulas.

The Recipe

This recipe is in two parts. This first part changes the Checkbook spreadsheet into a publisher, so it creates an edition file called Check.Balance. The second part uses this edition.

△ **Important** This recipe assumes you are already familiar with selecting cells and entering values. If not, refer back to the Checkbook recipe, which gives a lot more detail. △

What You Do	Why You Do It
❑ Open the checkbook spreadsheet.	

❑ Use the Save As... command to save the spreadsheet to a new name. I used Checkbook.Pub.	This step isn't actually necessary. Since there are two separate recipes described in this chapter, I created two versions of the checkbook spreadsheet. The one described in the last section is called Checkbook, while the modified one you are creating now is called Checkbook.Pub. You can skip this step.
❑ Select cell F1, pull down the Edit menu, and select Create Publisher...	This creates the edition that we'll subscribe to from the net worth spreadsheet.
Enter a file name for the edition. On the samples disk, I used Check.Balance. Press Publish to create the edition file.	
❑ Save the spreadsheet.	This step actually writes the edition file.
	You can leave the window open or close it before proceeding to the next part of this recipe.

This is the second part of this recipe. This part creates a simple net worth spreadsheet that subscribes to the edition created in the first part.

What You Do	Why You Do It
Step 1: Create the Net Worth spreadsheet.	
❑ Pull down File and select New... to open a new spreadsheet.	
❑ Select cell A1 and enter the label "Net Worth."	This step and a few that follow create the various cells in the spreadsheet.
❑ Enter the label "Total" in cell B1.	
❑ Enter the label "Checking" in cell B2.	
❑ Enter the label "Savings" in cell B3.	
❑ Enter the formula "=C2+C3" in cell C1.	
❑ Enter a dummy value, like 65816, in cell C3 as a savings account balance.	
❑ Select cells A1:C1. Use the Font... command to change these to bold text.	The next few steps format the cells.
❑ Select cells C1:C3. Use the Cell Attributes command to format these cells for "Dollar."	

- ❑ Use the mouse to widen columns A, B and C by one character each, giving enough room to display the titles.

Step 2: Subscribe to the Check.Balance edition.

- ❑ Select cell C2.

  Pull down the Edit menu and select Subscribe to Values...

  Select the file Check.Balance and press "Subscribe."

This is all there is to it! Your spreadsheet will automatically update cell C2 any time the spreadsheet is opened.

You used Subscribe to Values... here. The Subscribe... command pulls in the formula from the other spreadsheet, which isn't what you want. See the descriptions for the two commands in Chapter 3 for details about the difference between the two commands.

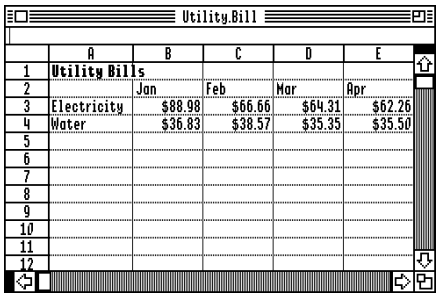
See "Show Editions" in Chapter 3 if you don't like the green background for the edition cell.

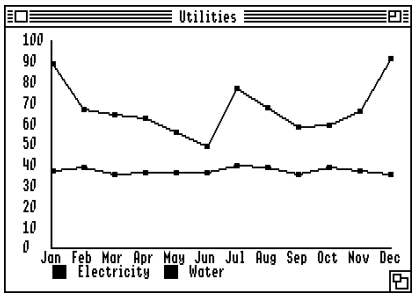
Utility Bill Graph

What it Does

The utility bill spreadsheet is really just a tool for creating a graph of utilities by month. The emphasis of this recipe is creating the graph itself.

There are lots of options in Quick Click Calc for creating charts and graphs, and this example only shows one of them. More than any other recipe in this chapter, this one lends itself to some exploring! You might want to work through the recipe as it stands the first time, but by all means, go back and try some of the other options when you are finished.





Ideas Covered

- Creating a line chart from spreadsheet data.

The Recipe

△ **Important** This recipe assumes you are already familiar with selecting cells and entering values. If not, refer back to the Checkbook recipe, which gives a lot more detail. △

What You Do	Why You Do It
Step 1: Create the spreadsheet.	Actually, since the point of this recipe is to explore charts, you might want to open the file Utility.Bill from the Samples folder on your Quick Click Calc disk, and skip the tedious details of entering all of the numbers in this spreadsheet. If you need the practice, though, all of the details are here.
❑ Pull down File and select New... to open a new spreadsheet.	
❑ Enter the label “Utility Bills” in cell A1. Use the Font... command to change this field to bold text.	Creates a title for the spreadsheet.
❑ Enter the labels “Jan”, “Feb”, “Mar” and so forth into the cells B2, C2, D2, and so on. You will need entries for 12 months.	Creates month labels. This helps you read the spreadsheet, labeling the proper month for a bill. These labels will also appear in the chart, showing which data point belongs to which month.
❑ Enter the label “Electricity” in cell A3.	This label and the next one identify what bills go in a particular row. They are also used to distinguish between the two lines that appear in the finished chart.
❑ Enter the label “Water” in cell A4.	
❑ Enter these values in cells B3 to M3: 88.98 66.66 64.31 62.26 55.17 48.88 77.09 67.17 57.74 58.77 66.02 91.77	These are some actual electric bills from a few years ago.

- ❑ Enter these values in cells B4 to M4:

  36.83 38.57 35.35 35.50
  35.69 35.94 39.58 38.30
  35.02 38.37 36.73 35.10

  These are some fictitious water bills, based on some typical water bills for those of us who live in deserts and water our grass.

- ❑ Select cells B3:M4 and use the Cell Attributes... command to format the cells for dollar amounts.

Step 2: Plot the data.

- ❑ Select cells B3:M4.

  These are the cells we'll plot. While you don't have to select the cells you want to plot before you move on, it makes things easier, since the chart will start with the proper cells already entered in the proper spot.

- ❑ Pull down Chart and select New Chart...

  What you will see is the Edit Chart dialog. This dialog has dozens of options. We'll pick out a few specific ones for this chart, but this is where some exploring pays off. Don't be afraid to try variations! The worst thing that can happen is you'll get an ugly chart—and you can always edit it!

  See "New Chart..." in Chapter 3 for a complete description of all of the options.

- ❑ Click on the Line icon in the left column of icons.

  This selects a line graph from the three main chart options.

- ❑ Click on the Line icon in the second column of icons.

  Creates a chart with lines connecting the data points.

- ❑ Select "Box" from the "Dot Size" pop-up menu.

  When you create a graph with connected lines, sometimes the actual location of the data seems to get lost in the lines. I like to use a box to show off the actual data points.

❑ Enter the value 100 in the "Max" LineEdit box.	Unless you tell it otherwise, Quick Click Calc creates a chart with 0 at the bottom and the largest value it finds in the data at the top. The spreadsheet also creates some numbers along the Y axis of the chart, though, and those numbers look a lot better if you pick some sort of sensible number for the upper value. In this case, since the largest values are in the $90.00 range, we'll force the upper limit of the chart to be $100.
❑ Press "Plot."	This plots the chart you saw at the top of the recipe. The various chart commands in the chart menu are pretty obvious, and should be easy to use if you are at all familiar with desktop programs. Explore a little! See Chapter 3 if you get stuck.

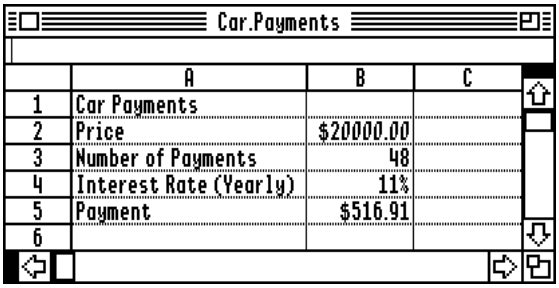
Car Payments

What it Does

The Car Payments spreadsheet calculates the monthly payment needed to pay off a car loan. You enter the price of the car, the number of monthly payments, and the annual interest rate, and the spreadsheet calculates the monthly payment.

A spreadsheet like Quick Click Calc is a powerful, and sometimes imposing, tool. Because it can do so much, many people forget that it's a great tool for doing simple jobs, too. In fact, a spreadsheet is really just an overgrown calculator, and you can use it for a lot of things that are just a little too complicated for a calculator, but not nearly so advanced as tracking your checkbook.

This spreadsheet actually has quite a bit of excess formatting, simply to make it easier for you to see how it works. In real life, you might just bring up a blank spreadsheet and type a simple formula into a cell. When I use a spreadsheet as a calculator, like this recipe does, I usually don't even save the results. I've created, used, and never saved hundreds of spreadsheets like this one!



Ideas Covered

- Using the PMT function to find the payment needed to pay off a car loan.
- Using the spreadsheet as a calculator.
- Using percents.

The Recipe

△ **Important** This recipe assumes you are already familiar with selecting cells and entering values. If not, refer back to the Checkbook recipe, which gives a lot more detail. △

What You Do	Why You Do It
❑ Pull down File and select New... to open a new spreadsheet.	
❑ Enter the label “Car Payments” in cell A1. Use the Color... command to make this label purple.	The labels tell what the values in column 2 mean.
❑ Enter the label “Price” in cell A2.	
❑ Enter the label “Number of Payments” in cell A3.	
❑ Enter the label “Interest Rate (Yearly)” in cell A4.	
❑ Enter the label “Payment” in cell A5.	
❑ Enter the value 20000 in cell B2. Use the Cell Attributes command to format this cell as a dollar amount.	This is the price of the car.

❑ Enter the value 48 in cell B3.	This is the number of months it will take to pay off the car. Car loans used to be 36 months (3 years) long, but lately have gone to 48 and even 60 months! Soon, we'll be taking out car mortgages instead of loans.
❑ Enter the value 11% in cell B4.	This is the annual interest rate.
Use the Cell Attributes command to format this cell as a percent.	And yes, you really can enter the interest rate as "11%". The spreadsheet converts 11% to the value 0.11. For more about constants, see "Entering Spreadsheet Values and Labels" in Chapter 4.
❑ Enter the formula = Pmt(B2, B4/12, B3) in cell B5.	The PMT function calculates the loan payment based on the present value of the loan (how much you borrow), the interest rate per period, and the number of periods.
Use the Cell Attributes command to format this cell as a dollar amount.	This is just one of the many powerful financial functions in a modern spreadsheet. For more of these functions, see Chapter 4.

Chapter 3 – Command Reference

This chapter describes the desktop interface used by Quick Click Calc. Each of the menu commands is described, the Finder interface is examined, and special commands and features of the spreadsheet window are examined. See Chapter 4 for a description of spreadsheet formulas and functions.

In several places, this documentation refers you to Apple's System Disk manuals. These are the manuals that came with your computer. The most recent version comes with Apple's System Disk 6.0.1, available from a variety of sources.

Finder Interface

Teaching the Finder About Quick Click Calc

Apple's Finder can automatically use Quick Click Calc to open files or print documents, as described in the next two sections. Before it can do that, though, you have to tell the Finder Quick Click Calc exists, and just which files it can use. Teaching the Finder about Quick Click Calc is pretty simple, though—all you do is run QCCalc.Sys16 one time from the Finder. When you do that, the Finder saves some information about Quick Click Calc in its desktop file, and from then on (unless you delete the desktop file, of course) the Finder can do the things described in the next two sections.

Opening Files

When you open a Quick Click Calc document from Apple's Finder, either by selecting one or more documents and opening them from the File menu or by double-clicking on a Quick Click Calc document, the Finder will start Quick Click Calc, which will open one window for each document you pick.

Printing Files

You can print spreadsheets without running Quick Click Calc. Select the Quick Click Calc spreadsheet documents you want to print and pick the Print command from the Finder's menu. The Finder runs Quick Click Calc, which prints the files you selected and returns to the Finder.

Apple Menu

About Quick Click Calc...

The about box shows the copyright notice and version number for Quick Click Calc. The version number is something you need to check, especially if you are about to call for technical assistance with Quick Click Calc.

Desk Accessories

Any remaining items in this menu are desk accessories. You can find a general description of desk accessories in Apple's System Disk manuals. For specific information about a particular desk accessory, see the documentation that comes with the desk accessory.

File Menu

New

The New command opens a new spreadsheet window, like the one that opens by default when you run Quick Click Calc.

See "The Spreadsheet Window," later in this chapter, for a description of the various mouse and keyboard commands available in this window.

Open...

The Open command brings up a slightly modified Apple open dialog. Most of the dialog's features are described in Apple's System Disk manual.

Importing Files

Normally, the Open dialog lists folders (so you can open them and look inside) and Quick Click Calc spreadsheet documents. When you select "Import AppleWorks 3.0 and ASCII Files" using the check box at the bottom of the dialog, the file list also shows AppleWorks 3.0 files and text files.

Quick Click Calc opens AppleWorks 3.0 files, automatically converting them to Quick Click Calc files. Once the file is saved, it becomes a Quick Click Calc file, which the spreadsheet will recognize. All AppleWorks 3.0 spreadsheet functions are recognized, although a few of the formatting options are different enough in the two spreadsheets that they are ignored.

Many spreadsheets, including AppleWorks GS and Quick Click Calc, can write their information to an ASCII file. You can also create ASCII files for the spreadsheet using other programs, like databases or programming languages. Quick Click Calc can import these ASCII files. When an ASCII file is imported, Quick Click Calc scans the file for tabs and returns. Each tab character starts a new cell, and each return character moves to the first cell in a new row. The information for each cell is imported as if you moved to the cell and typed the information in.

Passwords

If you open a file that was saved with password protection, you will see the password dialog.

You must enter the password exactly as it was entered when the file was saved. The password is case sensitive, too, so “fred” won’t open a file saved with the password “Fred”.

If you loose your password, you’ve lost the file!

Close

This command closes the front window. It works on all Quick Click Calc windows and most windows opened by desk accessories.

Save

Saves the contents of the front window. If the front window has never been saved to disk, this command works exactly like the Save As... command.

Save As...

For spreadsheet files, this command brings up a slightly modified standard Apple save dialog. The modifications are described below. For charts, this command brings up a standard Apple save dialog. Apple’s save dialog is described in Apple’s System Disk manual.

Encrypting Files

Encrypting a file is a fast, easy way to keep your valuable or sensitive information from casual prying eyes. Once a file is encrypted, you can’t load it from disk without the password.

▲ **Warning** If you loose your password, you have lost the file! Be sure the password is something you will remember. ▲

It's fair to ask just how secure your information is. A good way to thing about encryption is that it's like a lock on your house. Yes, it can be broken. There are government agencies with talented code breakers and huge computers that can no doubt break into an encrypted Quick Click Calc file—if they had a good enough reason to spend the time and money to do it. Most people don't have the time, expertise, or a powerful enough computer to break into our files, though.

By far the easiest way to break into a file is to steal the password. The password to a file is the key to the file. Writing your passwords on a piece of paper and sticking the paper in your desk drawer is about as bright as putting a door key under your door mat. Your password should be easy to remember, but not too short. For maximum protection, you should use different passwords for each file.

To encrypt a file, select "Encrypt the File" using the check box near the bottom of the save dialog. Enter a password for the file two times. You must enter the same password in both LineEdit items before you can click OK. This is a simple check to make sure you don't encrypt a file with a password that contains a typographical error. Once you select OK, the file will be encrypted on all subsequent saves. If you select cancel, the file won't be encrypted.

Exporting Files

You can export a Quick Click Calc spreadsheet file as an ASCII text file. This is a handy way to get information into other programs, like spreadsheets on other computers or databases.

All of the information in the spreadsheet cells is saved to the file. Each row is saves as a line of text, with tab characters separating each field.

Revert...

Reloads the last version of the file that was saved to disk, removing any changes made since the last save. You are prompted before the operation is carried out.

Page Setup...

This command opens a printer page setup dialog. Quick Click Calc supports any printer driver that conforms to Apple's standards. Apple's printer drivers are described in Apple's System Disk manual; for other printer drivers, see the documentation that came with the driver.

Print...

This command opens a print dialog. Quick Click Calc supports any printer driver that conforms to Apple's standards. Apple's printer drivers are described in Apple's System Disk manual; for other printer drivers, see the documentation that came with the driver.

The print command will print spreadsheets, charts and cell notes. When you print a spreadsheet, the Print command prints only the selected cells. If no cells are selected, all cells from A1 to the last occupied cell are printed.

Print Window...

This command opens a print dialog. Quick Click Calc supports any printer driver that conforms to Apple's standards. Apple's printer drivers are described in Apple's System Disk manual; for other printer drivers, see the documentation that came with the driver.

This command prints only those cells that are currently visible in the window. It recognizes split screens, too, printing the cells across a split screen as if they were adjacent in the spreadsheet.

Quit

This command leaves Quick Click Calc. Before leaving, all windows are closed. If any window has changed since it was last saved to disk (or since it was created, if it has never been saved to disk), you will get a chance to save the file, not save the file, or stop shutting down the program.

Edit Menu

Undo

The undo command revokes the last change in many places within the spreadsheet.

When used after changing cells or formatting options in a spreadsheet window, Undo returns the last cell that was changed to its previous state.

When used while editing a formula, Undo returns the formula to the state it was in before any editing started.

Undo works in many dialogs, reversing editing changes in LineEdit items.

Undo is also supported by many desk accessories.

Cut

Cut copies information into the system scrap, where it can be pasted using the Paste command. The information is then deleted. Using Cut is exactly like using Copy and then Clear on the same information. See those commands for details.

Copy

Copy copies information into the system scrap. Once the information is in the system scrap, you can paste it to other locations using the Paste command. You can also paste information from the spreadsheet into other programs, like word processors, that support Apple's Scrap Manager.

There are four places where Copy can be used in Quick Click Calc. This command is also supported by many desk accessories.

You can select a cell or range of cells and copy information from the cells. Once the information is copied, you can use Paste or Paste Values to place the information in another cell or group of cells in the same spreadsheet, or in a different spreadsheet.

When you copy a cell or cells, then paste the information into a text field or some other program that does not recognize spreadsheet cells, the information is pasted as ASCII text. The values of the cells are shown. Each cell in a row is separated from other cells by a tab character, and rows are separated by a return character.

You can copy text from the formula entry box at the top of a spreadsheet window. The information you copy this way is text information, and cannot be pasted as a cell. It can be pasted into the formula entry box, either for the cell you are currently editing, or later in a different cell. You can also paste text information into most other programs, into LineEdit items in dialogs and into cell notes.

Finally, you can copy text from LineEdit items in the various dialogs in Quick Click Calc, and from cell notes. This information can be pasted into formulas in the formula entry box, as well as into other LineEdit items, cell notes, and other programs that accept text.

Paste

Paste pastes information from the system scrap. The Paste command is supported by many desk accessories, and is available in four places in Quick Click Calc.

If the information in the scrap is a cell or range of cells copied from a Quick Click Calc spreadsheet, you can paste the cells into the current spreadsheet. Start by selecting the top left cell to change, then use the Paste command. If the range of cells you have selected is smaller than the range of cells being pasted, one safety check is made: If there are any cells that are not blank and not selected that will be changed, you are prompted before the cells are changed.

△ **Important** When you paste cells with the Paste command, it is the formula, not the value, that is actually placed in the cell.

Cells are normally adjusted by position. For example, if you copy a cell with the formula

=D4+6

from cell C4, then paste into cell C5, the formula is adjusted, and becomes

=D5+6

See "Fixed Cells" in Chapter 4 for ways to prevent the cells from being adjusted in this way. △

You can also paste text into the formula entry box while you are editing a formula, into LineEdit boxes in dialogs, and into cell notes.

Paste Values

Paste Values is only used to paste cells, and is only available when a cell is selected. For the most part, Paste Values works pretty much like Paste. The difference is that the Paste command pasts formulas, while the Paste Values command pasts the current value of a function.

☆ **Tip** Use Paste Values when it's the number you're after, like the balance in a checkbook. Use Paste when it's the formula you want, as in extending the number of entries in a checkbook spreadsheet. ☆

Clear

Clear deletes the selected information. It is supported by many desk accessories, and in four places in the spreadsheet.

When cells are selected, you can use Clear to delete the contents of the cells. Clear does no remove cells from a spreadsheet. To remove cells or rows, use the Delete command.

When editing formulas in the formula entry box, when text is selected in an LineEdit item in a dialog, and when text is selected in a cell notes window, Clear deletes the selected text.

Note When something is selected, the Delete key works just like Clear.

Select All

Selects all of the cells in the spreadsheet.

Create Publisher...

Create Publisher is used to create a new edition. This command is disabled unless a spreadsheet window with at least one selected cell is frontmost.

Editions are used to automatically pass information from one spreadsheet to another. For an example that explains how all of the pieces of publish and subscribe fit together, see "Net Worth" in Chapter 2.

This command opens a standard Apple Save dialog. You use this dialog to select a location for an edition, as well as a file name for the edition. When you click on the Publish button, the selected cells are saved in an edition file. This edition file is updated automatically each time you save the spreadsheet.

△ **Important** Information in an edition is publicly available. Even if the spreadsheet itself is encrypted, cells that are published in an edition file are not encrypted, and can be read by anyone with a copy of Quick Click Calc. △

Subscribe To...

Subscribe To... is used to subscribe to an edition. This command is disabled unless a spreadsheet window with at least one selected cell is frontmost.

Editions are used to automatically pass information from one spreadsheet to another. For an example that explains how all of the pieces of publish and subscribe fit together, see "Net Worth" in Chapter 2.

This command opens a standard Apple Open dialog. You use this dialog to select an edition that will be included in your spreadsheet. Once the edition is selected, the cells in the edition are, in effect, pasted into your spreadsheet. The edition cells are updated automatically each time you open the spreadsheet. You can also update one or all of the editions manually using the Edition Options... command, described later in this chapter.

Like the Paste command, Subscribe To... pasts cell formulas, not cell values. In most cases, when you publish information and subscribe from another spreadsheet, you really want the values, not the formulas. To subscribe to values only, use the Subscribe To Values... command.

Subscribe to Values...

Subscribe To Values... is used to subscribe to an edition. This command is disabled unless a spreadsheet window with at least one selected cell is frontmost.

Editions are used to automatically pass information from one spreadsheet to another. For an example that explains how all of the pieces of publish and subscribe fit together, see "Net Worth" in Chapter 2.

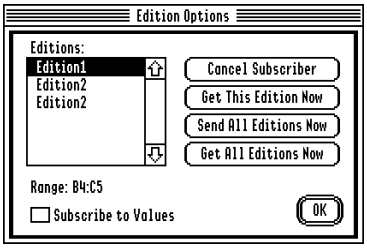
This command opens a standard Apple Open dialog. You use this dialog to select an edition that will be included in your spreadsheet. Once the edition is selected, the cells in the edition are, in effect, pasted into your spreadsheet. The edition cells are updated automatically each time you open the spreadsheet. You can also update one or all of the editions manually using the Edition Options... command, described later in this chapter.

Like the Paste Values command, Subscribe To Values... pastes cell values, not cell formulas. In most cases, when you publish information and subscribe from another spreadsheet, this is what you want. Regardless of how the value in the original spreadsheet was calculated, what you see in the subscriber spreadsheet is the same value that is shown in the publisher spreadsheet. If you really need the formulas instead of the values, use the Subscribe To... command.

Edition Options...

The Edition Options command is used to make changes to editions, get rid of them completely, or to force a manual update to editions. This command is disabled unless a spreadsheet window containing editions is frontmost.

The Edition Options command beings up this dialog:



The list shows all of the editions in the spreadsheet. Both published editions and editions the spreadsheet subscribes to are shown. There are three distinct kinds of actions you can perform on editions from this dialog:

You can cancel an edition by selecting the edition from the list of editions, then clicking on "Cancel Publisher" or "Cancel Subscriber." The same button is used, but the name changes based on whether you have selected a publisher or a subscriber. Canceling a subscriber does not delete the contents of the cells; it simply stops the program from updating the cells in the future. Canceling a publisher does not delete the edition file, but the edition file will not be updated in the future.

The next three buttons control manual publishing and subscribing. The second button is "Send This Edition Now" or "Get This Edition Now," depending on whether you have selected a published edition or an edition the spreadsheet subscribes to. This button updates the single edition you have selected from the edition list. The two buttons below are used to manually update all publishers or subscribers.

You can subscribe either to cell values or cell formulas. If you have selected a subscriber edition, the “Subscribe to Values” check box will be available, and will be checked if the edition subscribes to values only. You can change this setting, and the edition will reflect the change the next time it is updated.

Windows Menu

All of the open windows, both spreadsheet windows and charts, are listed in this menu. The frontmost window is checked. You can select any window, even when it is not visible, by picking the name of the window from the menu.

Select Menu

Select All

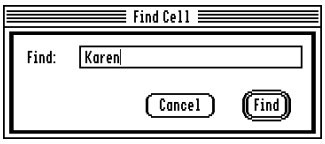
Select All selects all of the cells in the spreadsheet. This command is not available unless a spreadsheet window is frontmost.

Last Cell

Last Cell selects the last cell in the spreadsheet. This command is not available unless a spreadsheet window is frontmost.

The last cell isn’t the cell at the bottom right of the entire spreadsheet. The last cell is the cell at the bottom right portion of the block of cells actually in use. For example, if you create a new spreadsheet and fill in cells D4 and B6, the last cell is D6. Another way of thinking about the last cell is that there are no occupied cells below or to the right of the last cell.

Find...



Find... is used to locate text in a cell. It is available whenever a spreadsheet window is frontmost. The Find command brings up a dialog like the one shown here.

Enter the text in the LineEdit item and click Find to find the next occurrence of the text in the spreadsheet.

The search begins with the cell to the right of the currently selected cell, or in cell A1 if no cells are selected. Cells are searched first by row, proceeding to the right until the end of the row

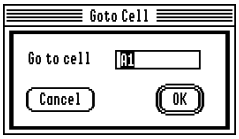
is reached. The search then continues with the next row. If the last cell is reached before the search string is found, the search starts again at cell A1.

The search examines text in all label cells. Strings constructed using string formulas and strings imbedded in formulas or numeric constants are not scanned.

The string search is case insensitive.

Goto...

Goto... is used to move directly to a cell. The command brings up this dialog:



Enter the name of the cell in the LineEdit box and select OK. The window is scrolled to show the cell you named, and the cell is selected.

Show Selected Cell

This command scrolls the spreadsheet to show the currently selected cell. If a range of cells is selected, the spreadsheet scrolls to show the top left cell in the selected range.

Tools Menu

Insert

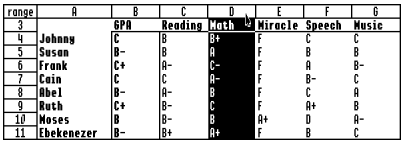
The Insert command is used to insert rows or columns in a spreadsheet. It is available when a spreadsheet window is frontmost and at least one cell is selected.

To insert a row, select a cell or row of cells, then use the Insert command. The selected cell and all cells below it are moved down one row, and a new, blank row is inserted. The cursor remains in the same relative position, so it ends up on the new row.

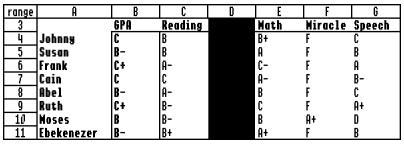
range	A	B	C	D	E	F	G
3		GPA	Reading	Math	Miracle	Speech	Music
4	Johnny	C	B	B+	F	C	C
5	Susan	B-	B	A	F	B	B
6	Frank	C+	A-	C-	F	A	B-
7	Cain	C	C	A-	F	B-	C
8	Abel	B-	A-	B	F	C	A
9	Ruth	C+	B-	C	F	A+	B
10	Moses	B	B-	B	A+	D	A-
11	Ebekenezer	B-	B+	A+	F	B	C

range	A	B	C	D	E	F	G
3		GPA	Reading	Math	Miracle	Speech	Music
4	Johnny	C	B	B+	F	C	C
5	Susan	B-	B	A	F	B	B
6							
7	Frank	C+	A-	C-	F	A	B-
8	Cain	C	C	A-	F	B-	C
9	Abel	B-	A-	B	F	C	A
10	Ruth	C+	B-	C	F	A+	B
11	Moses	B	B-	B	A+	D	A-

To insert a column, select a column by clicking on the column name at the top of the spreadsheet, then use the Insert command. The column selected and all columns to its right are moved right one column, and a new blank column is created. The cursor remains in the same relative position, ending up in the new column.



range	A	B	C	D	E	F	G
3		GPA	Reading	Math	Miracle	Speech	Music
4	Johnny	C	B	B+	F	C	C
5	Susan	B-	B	A	F	B	B
6	Frank	C+	A-	C-	F	A	B-
7	Cain	C	C	A-	F	B-	C
8	Abel	B-	A-	B	F	C	A
9	Ruth	C+	B-	C	F	A+	B
10	Moses	B	B-	B	A+	D	A-
11	Ebekenezer	B-	B+	A+	F	B	C



range	A	B	C	D	E	F	G
3		GPA	Reading		Math	Miracle	Speech
4	Johnny	C	B		B+	F	C
5	Susan	B-	B		A	F	B
6	Frank	C+	A-		C-	F	A
7	Cain	C	C		A-	F	B-
8	Abel	B-	A-		B	F	C
9	Ruth	C+	B-		C	F	A+
10	Moses	B	B-		B	A+	D
11	Ebekenezer	B-	B+		A+	F	B

☆ **Tip** Since the cursor doesn't move as you insert rows and columns, you can do several inserts in a row, then wait for the spreadsheet to catch up with you. ☆

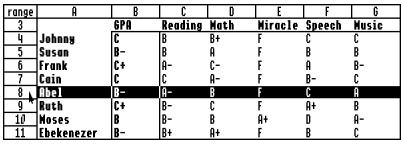
Formulas are normally updated to reflect the new position of cells used in the formula. See "Fixed Cells" in Chapter 4 for ways to prevent the cells from being adjusted in this way.

Delete

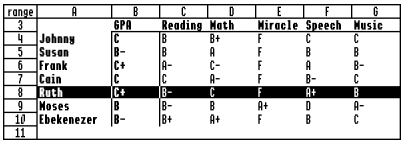
The Delete command is used to delete rows or columns in a spreadsheet. It is available when a spreadsheet window is front and at least one cell is selected.

To delete a row, select a cell or row of cells, then use the Delete command. The selected cell and all cells on the same row are deleted from the spreadsheet, and all cells below the selected cell are moved up one row. The cursor remains in the same relative position, so it ends up on the row after the deleted row.

To delete more than one row, select all of the rows to delete, then use the Delete command.



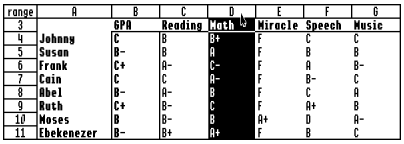
range	A	B	C	D	E	F	G
3		GPA	Reading	Math	Miracle	Speech	Music
4	Johnny	C	B	B+	F	C	C
5	Susan	B-	B	A	F	B	B
6	Frank	C+	A-	C-	F	A	B-
7	Cain	C	C	A-	F	B-	C
8	Abel	B-	A-	B	F	C	A
9	Ruth	C+	B-	C	F	A+	B
10	Moses	B	B-	B	A+	D	A-
11	Ebekenezer	B-	B+	A+	F	B	C



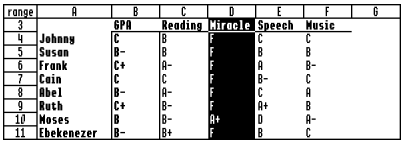
range	A	B	C	D	E	F	G
3		GPA	Reading	Math	Miracle	Speech	Music
4	Johnny	C	B	B+	F	C	C
5	Susan	B-	B	A	F	B	B
6	Frank	C+	A-	C-	F	A	B-
7	Cain	C	C	A-	F	B-	C
8	Ruth	C+	B-	C	F	A+	B
9	Moses	B	B-	B	A+	D	A-
10	Ebekenezer	B-	B+	A+	F	B	C
11							

To delete a column, select a column by clicking on the column name at the top of the spreadsheet, then use the Delete command. The column and all of its cells are deleted, and the cells to the right of the column move to the left to fill in the gap.. The cursor remains in the same relative position, ending up on the column after the deleted column.

To delete more than one column, select all of the columns to delete, then use the Delete command.



range	A	B	C	D	E	F	G
3		GPA	Reading	Math	Miracle	Speech	Music
4	Johnny	C	B	B+	F	C	C
5	Susan	B-	B	A	F	B	B
6	Frank	C+	A-	C-	F	A	B-
7	Cain	C	C	A-	F	B-	C
8	Abel	B-	A-	B	F	C	A
9	Ruth	C+	B-	C	F	A+	B
10	Moses	B	B-	B	A+	D	A-
11	Ebekenezer	B-	B+	A+	F	B	C

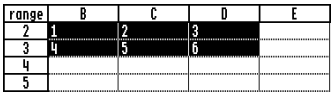


range	A	B	C	D	E	F	G
3		GPA	Reading	Miracle	Speech	Music	
4	Johnny	C	B	F	C	C	
5	Susan	B-	B	F	B	B	
6	Frank	C+	A-	F	A	B-	
7	Cain	C	C	F	B-	C	
8	Abel	B-	A-	F	C	A	
9	Ruth	C+	B-	F	A+	B	
10	Moses	B	B-	A+	D	A-	
11	Ebekenezer	B-	B+	F	B	C	

Formulas are normally updated to reflect the new position of cells used in the formula. See "Fixed Cells" in Chapter 4 for ways to prevent the cells from being adjusted in this way. If a formula refers to a deleted cell, the cell containing the formula will show *Error*, and the cell reference in the formula edit box will display as <offsheet>.

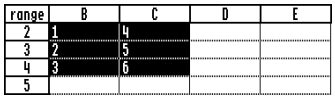
Transpose

Transpose rotates the selected cells, as shown below:



range	B	C	D	E
2	1	2	3	
3	4	5	6	
4				
5				

Before Transpose



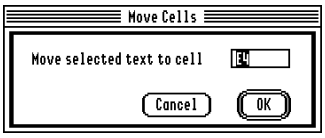
range	B	C	D	E
2	1	4		
3	2	5		
4	3	6		
5				

After Transpose

This command is available when a spreadsheet window is frontmost and at least one cell is selected.

Formulas are normally updated as if each cell were copied and pasted. See "Fixed Cells" in Chapter 4 for ways to prevent the cells from being adjusted in this way.

Move...



Moves the selected cells to a new location. This command is available when a spreadsheet window is front and at least one cell is selected.

When you select the Move command, the Move Cells dialog appears. Type the name of a destination cell. The selected cells are moved to the new location, with the top left cell from the selected cells replacing the cell you enter in the LineEdit box. The effect is exactly the same as using the Cut command to remove the selected cells, then selecting an appropriate range of cells at the destination location and using the Paste command.

Fill Right

Copies formulas from the leftmost selected cell into selected cells to the right of the leftmost cell. This command is available when a spreadsheet window is front and at least one cell is selected.

The Fill Right command is used to quickly fill one or more rows of cells with the same formula or value. The effect of this command is similar to using the Copy command to copy the leftmost column of cells from the selected range of cells, and then pasting the column of cells into each selected area. The only significant difference between using this command and using repeated Paste commands is that this command does not affect the scrap.

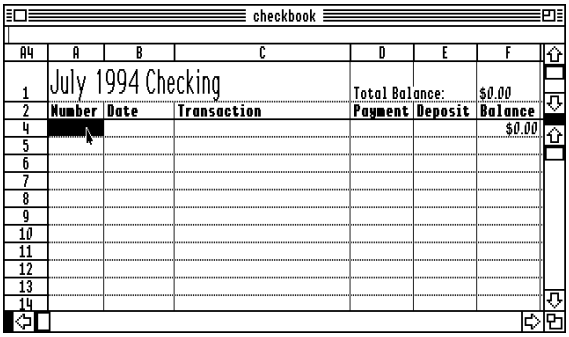
The Fill Right command is similar to the Fill Down command. See the Fill Down command for an example.

Fill Down

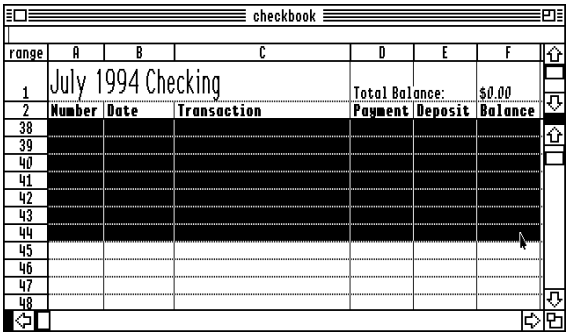
Copies formulas from the topmost selected cell into selected cells below the topmost selected cell. This command is available when a spreadsheet window is frontmost and at least one cell is selected.

The Fill Down command is used to quickly fill one or more columns of cells with the same formula or value. The effect of this command is similar to using the Copy command to copy the topmost row of cells from the selected range of cells, and then pasting the row of cells into each selected area. The only significant difference between using this command and using repeated Paste commands is that this command does not affect the scrap.

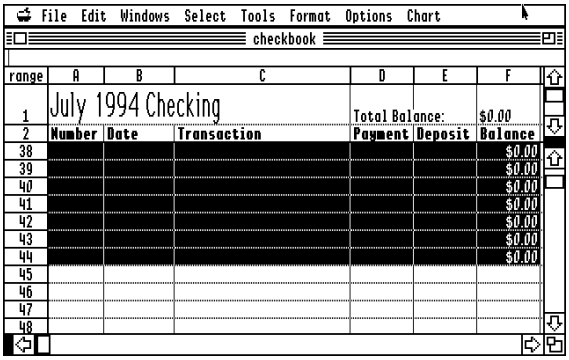
As an example, suppose you are creating a checkbook spreadsheet like the one shown below. Each line contains the entry for one check or deposit, with a check balance cell that adds or subtracts the amounts to show the amount in your account after the transaction. Rather than reentering the formulas on each line, or using Copy and Paste to copy each of the dozens of lines in the spreadsheet, you can use the Fill Down command. Start by selecting the leftmost cell in the top checkbook entry.



Next, use the scroll bar to scroll down far enough to accommodate all of the entries in the spreadsheet. Hold down the shift key and click on the last line you want filled in, far enough over to include all of the cells you need to fill.



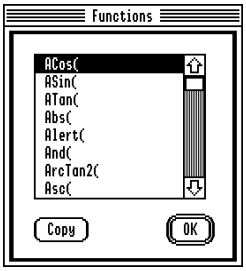
The last step is to pick the Fill Down command, which fills the blank checkbook entries.



List Functions...

The List Functions... command lists all of the functions available in Quick Click Calc. This command is available whenever a spreadsheet window is frontmost.

The List Functions... command brings up the dialog shown to the right. You can scroll through this list of functions for a quick reminder of the names of functions. Once a function is selected, you can also copy the name into the system scrap, then use the Paste command to paste the function into the formula edit box.



Cell Note...

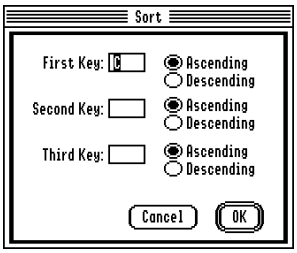
The Cell Note... command allows you to create, edit and read notes that are attached to individual cells. This command is available whenever a spreadsheet window is frontmost and a single cell is selected.

The Cell Note... command brings up a Text Edit window. You can enter whatever text you want in the window using standard Apple text editing commands. The text is saved for the selected cell, and a small rectangle appears in the cell to indicate that the cell has a note. You can view or edit the text using this same command. You can also print cell notes. To remove a cell note, delete all of the text from the cell note window.

Sort...

The Sort... command sorts the rows in a spreadsheet based on one or more sort keys. This command is available whenever a spreadsheet window with at least once selected cell is frontmost.

The Sort... command brings up this dialog:



The key columns are the location of the information that controls the sort. For example, if you are sorting a checkbook by check number, you would use a single key column, giving the column name for the column containing the check numbers.

You can choose up to three key columns. The first key column is used to sort the information; the second key column is used to resolve ties in the first column; and the third key column is used to sort rows that remain tied after both the first and second key columns are used.

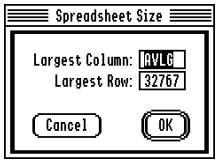
Each key can sort in ascending or descending order. Ascending order is what you would normally expect. In ascending order, smaller numbers come first, and text entries appear in alphabetical order, reading from the top.

The Sort... command works on any kind of information. Cell labels are sorted alphabetically. Cell values and cell constants are sorted in numerical order. If you select a range of cells that includes both values and labels, the labels will appear first, followed by any values.

Change Size...

Change Size... changes the number of cells available in a spreadsheet. This command is available whenever a spreadsheet window is frontmost.

The Change Size... command brings up this dialog:



The current size of the spreadsheet is shown in the LineEdit boxes. You can change the size to any number of cells from 16 to 32767 columns or rows.

Note The largest column is given as a row, not a number. The smallest allowed value is P, which is the 16th column. The largest allowed value is AVLG, which is the column name for the 32767th cell column.

The main advantage to changing the spreadsheet size is to create a spreadsheet where the scroll bars make sense. If you have a grade book with 30 entries, the default spreadsheet size of 999 rows is way too big, and the scroll bar moves way too far. By changing the size of the spreadsheet to 35 or so rows, you have a few extra rows for scratchpad calculations, but the scroll bar can be used effectively to move around in the spreadsheet.

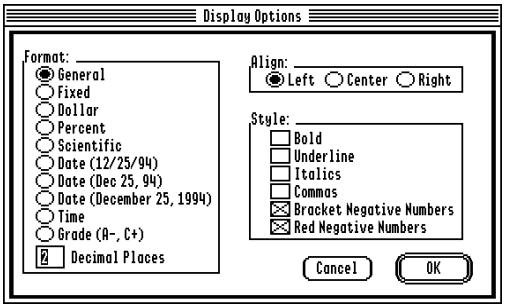
Of course, you can also create huge spreadsheets!

Format Menu

Cell Attributes...

The Cell Attributes... command is used to change the visual appearance of one or more spreadsheet cells. This command is available whenever a spreadsheet window is frontmost.

The Cell Attributes... command brings up the dialog shown to the right. This dialog controls three aspects of the visual appearance of a spreadsheet cell. Making changes in the dialog changes these visual aspects for any selected spreadsheet cell. If no cells are selected, the choices become the defaults when information is placed in a blank cell.



Note Only cells with information are affected. If you use this command on a selected empty cell, or on a range of cells containing empty cells, the formatting options have no effect on the empty cells. Once information is added to the cell, you will have to go back and change the formatting for the cell.

The radio buttons in the "Format:" area of the dialog control the way numbers are displayed in the cell. For example, you can display a number as a grade, so 3.1 shows up as a B. You can set the format for a label cell, but the format has no affect on the visual appearance of a label. Later, if you change the contents of the cell to a constant or formula, the format information will be remembered and used.

The table below shows the various format display options. Near the bottom of the Format: area of the dialog is an LineEdit box that allows you to enter the number of decimal places shown. This value is always saved, but is only used by a few of the display options, as noted in the table.

Format	Sample	Description
General	3.14159265	This is the default format. The number is shown in the best available numeric format. The full width of the cell is used, if needed. Trailing decimal zeros are eliminated, so 4.000 displays simply as 4. If the number is very large (an absolute value greater than 999999) or very close to zero (an absolute value smaller than 0.001),

		the display switches automatically to scientific notation to preserve some accuracy.
Fixed	3.14	Fixed place numbers are shown with a specific number of digits to the right of the decimal place, even if the digits are zero. Rounding is used when the undisplayed digits are not zero. This format uses the "Decimal Places" LineEdit box for the number of digits displayed.
Dollar	$3.14	This option works just like Fixed, but also displays a $ character to the left of the number.
Percent	17%	Percent displays the number as a percentage. The value is multiplied by 100 and rounded to the nearest integer, then displayed with a trailing % character.
Scientific	6.75E16	Scientific notation forces the use of an exponent. All numbers are displayed with a single digit to the left of the decimal point. The number of digits to the right of the decimal point is controlled by the "Decimal Places" LineEdit box. An exponent is always shown, even if it is zero.
Date (12/25/94)	7/4/76	The short date format displays the date in numeric form with month first, then the day of month, and finally the last two digits of the year. The number is the number of days since the day before January 1st, year 0, in the Gregorian calendar.
Date (Dec 25, 94)	Jul 4, 76	The medium date format displays the date in text form. Only the first three letters of the month are shown, and only the last two digits of the year.
Date (December 25, 1994)	July 4, 1776	The long date format displays the date in text form. The full name of the month and all digits of the year are shown.
Time	6:45:00	Time displays the number as a time, showing hours, minutes and seconds. The number is assumed to be the number of elapsed seconds since midnight.
Grade (A-, C+)	B+	Grade shows the letter grade based on a 4.0 grade point system. See "Grade Constants" in Chapter 4 for a complete description of the numbering system.

The "Align:" area controls the alignment of the text information. You can left justify, right justify, or center the text. This option affects all three kinds of cells: constant cells, formula cells, and label cells.

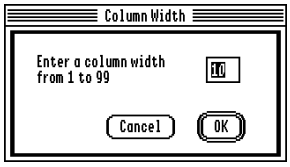
The “Style:” area controls the visual style of the text font. Bold, Underline and Italics control the font style, just like many word processors. (You can also change the font style with the “Font...” command.)

“Commas” controls the use of commas in numbers. When you select this option, commas are placed in numbers to group the digits in threes. For example, 12539 would be shown as 12,539.

“Bracket Negative Numbers” uses the < and > characters around numbers less than zero. This is the form generally used by accounting software and books. The other option is the mathematical convention of a - character before numbers that are less than zero.

“Red Negative Numbers” causes the default color for all numbers less than 0 to be red. Without this option, negative numbers are displayed in the same color as positive numbers; the default color in this case is black. You can also change the color of the text using the Color... command.

Column Width...

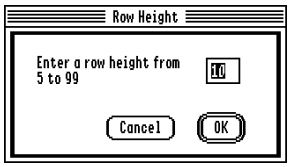


Changes the width of a column. This command is available whenever a spreadsheet window with one or more selected cells is frontmost.

The Column Width... command beings up the column width dialog shown to the right. The number is the minimum number of characters that can be displayed in the cell. This is converted to a screen width based on the widest character in the default display font.

Note You can also set the column width using the mouse. See “Changing the Size of Cells,” later in this chapter, for details.

Row Height...



Changes the height of a row. This command is available whenever a spreadsheet window with one or more selected cells is frontmost.

The Row Height... command brings up the row height dialog shown to the right. The number is the height of a cell in pixels. The height includes the dividing line between cells.

Note You can also set the row height using the mouse. See “Changing the Size of Cells,” later in this chapter, for details.

Hide Grid

Hides the grid, or, of it is already hidden, shows the grid. This command is available whenever a spreadsheet window is frontmost.

Note This command hides or shows the default gray grid lines. It does not hide lines you create with the Borders... command.

Show Notes Indicator

Shows or hides the small rectangle that indicates there is a note attached to a cell. See the "Cell Notes..." command, earlier in this chapter, for a description of cell notes.

This command is available whenever a spreadsheet window is frontmost.

Show Editions

Enables or disables the edition shading that indicates a cell is part of an edition. When enabled, cells that are published have a yellow background, while subscriber cells have a green background.

See the publish and subscribe commands, beginning with "Create Publisher...," earlier in this chapter, for details about editions.

This command is available whenever a spreadsheet window is frontmost.

Set Page Break

Sets a page break. This command is available whenever a spreadsheet window with one or more selected cells is frontmost.

When a spreadsheet or a range of cells in a spreadsheet is printed with the Print... command, cells are split across pages when the page becomes full. This command forces a page break. Cells to the right or below a page break always start at the top or left of a new page.

You can set a page break at a row boundary or a column boundary.

To set a page break before a row, select a row of cells by clicking on the row number at the left of the spreadsheet, then use the Set Page Break command.

To set a page break before a column, select the column by clicking on the column name at the top of the spreadsheet, then use the Set Page Break command.

You can set page breaks so a cell will appear at the top left of a fresh page by selecting a cell, then using the Set Page Break command. This sets both a column and row page break.

Page breaks are displayed as purple line, which replaces the default gray cell dividing line. You can hide page breaks by hiding the default grid.

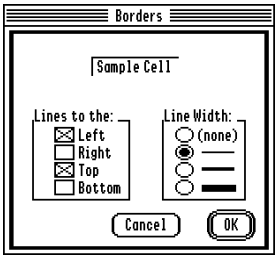
Clear Page Break

Clears a page break created with the Set Page Break command. This command is available whenever a spreadsheet window with one or more selected cells is frontmost.

Borders...

The Borders... command is used to add borders around specific cells in a spreadsheet to group and format information. This command is available whenever a spreadsheet window with one or more selected cells is frontmost.

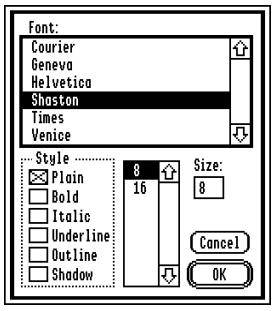
The Borders... command brings up this dialog:



With this dialog you can add black border lines on any side of a spreadsheet cell using one of three widths. Making changes in the dialog changes the borders for any selected spreadsheet cell.

Note Only cells with information are affected. If you use this command on a selected empty cell, or on a range of cells containing empty cells, the borders are not used on the empty cells. Once information is added to the cell, you will have to go back and add the borders.

Font...



The Font... command changes the font for a cell. This command is available whenever a spreadsheet window is frontmost.

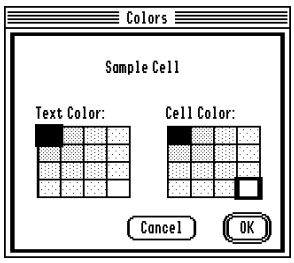
The Font... command brings up this standard Apple dialog for choosing fonts. This dialog controls the font used to display text in a spreadsheet cell. Making changes in the dialog changes the font for any selected spreadsheet cell. If no cells are selected, the choices become the defaults when information is placed in a blank cell.

Quick Click Calc allows you to set fonts for individual cells, using a different font and font style as often as you like. Taller fonts may extend above the height of a cell. In that case, you can change the

height of the cell using the Row Height... command.

Note Only cells with information are affected. If you use this command on a selected empty cell, or on a range of cells containing empty cells, the font has no effect on the empty cells. Once information is added to the cell, you will have to go back and change the font for the cell.

Color...



The Color... command changes the color for text and the background of a cell. This command is available whenever a spreadsheet window is frontmost.

The Color... command brings up the color dialog.

This dialog controls the color of the text in a cell, and the color of the background that surrounds the text. Making changes in the dialog changes the colors for any selected spreadsheet cell. If no cells are selected, the choices become the defaults when information is placed in a blank cell.

Note Only cells with information are affected. If you use this command on a selected empty cell, or on a range of cells containing empty cells, the color has no effect on the empty cells. Once information is added to the cell, you will have to go back and change the color for the cell.

Options Menu

Show Formulas

The Show Formulas command displays formulas instead of the calculated values from a formula. This command is available whenever a spreadsheet window is frontmost.

Show Values

The Show Values command displays values, reversing the effect of the Show Formulas command. This command is available whenever a spreadsheet window is frontmost.

Protected

The Protected command marks a cell as protected. The contents of a protected cell can be viewed, but not changed. Use the command again to reverse the effect.

A check will appear to the left of the Protected command whenever all of the selected cells are protected.

This command is available whenever a spreadsheet window with one or more selected cells is frontmost.

Calculate Now

Forces the spreadsheet to update all formulas that need to be recalculated. Random numbers generated by the RANDOM function are regenerated, and the date returned by the DATE function is updated.

This command is available whenever a spreadsheet window is frontmost.

Note The values in the spreadsheet update automatically, so there is usually no reason to use this command. Unless the Manual Calculation command has been used, the only reason to use this command is to change random numbers or update the current date.

Manual Calculation

Blocks automatic updating of spreadsheet cells. Once this command is used, changing a value or formula does not update formula cells that use the result until the Calculate Now command or Automatic Calculation command is used.

This command is available whenever a spreadsheet window is frontmost.

Note For the most part, this command is a hold-over from simpler spreadsheets that completely recalculated all cells after a change before allowing you to type anything. Quick Click Calc allows you to continue working while the spreadsheet updates in the background, so you won't normally need to use this command.

Automatic Calculation

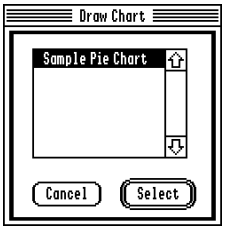
Reverses the effect of the Manual Calculation command. This command is available whenever a spreadsheet window is frontmost.

Chart Menu

Draw Chart...

Draws an existing chart. This command is available whenever a spreadsheet window with existing charts is frontmost.

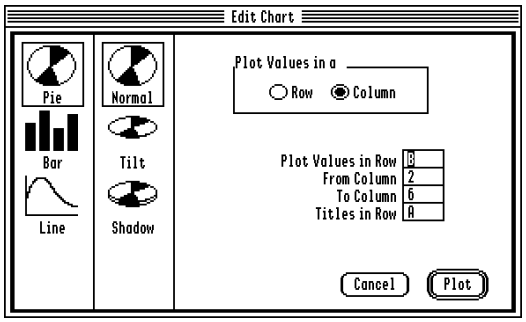
Draw Chart... brings up the chart selection dialog. Select a chart from the list of charts and press OK to display the chart.



New Chart...

Creates a new chart. This command is available whenever a spreadsheet window is frontmost.

New Chart... brings up this chart selection dialog:



☆ **Tip** You do not have to select any cells before using this command, but if you do, the cells you select are used to fill in the initial range of cells to draw. It's usually easier to select the cells to plot and then use New Chart... than to select New Chart... and then type the cell names in from the keyboard. ☆

There are three main areas of the Chart Editing dialog. On the left is a column of chart types. Click on one of these icons to select the major chart type. The next column gets more specific, choosing a subtype for the chart. The rightmost area contains the various parameters that control the chart.

Pie Charts

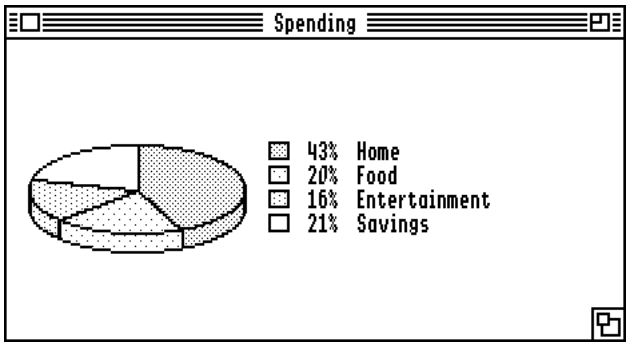
Pie charts are used to display a table of values, showing each value as a part of a group of values. For example, if you are showing where your money is being spent, you might break the amounts down into Home, Food, Entertainment, and Savings. A pie chart shows graphically how big each of these items is compared to each other and your overall income.

There are three subtypes of pie charts. The three subtypes display the same information in slightly different graphical forms. In all cases, you can plot either a column of data or a row of data, and must specify the range of data using the LineEdit items in the right portion of the dialog.

The only unexpected feature of this simple chart is the last LineEdit item, "Titles in Column." You can use label cells to label the values in a pie chart. For example, suppose you want to plot this data:

range	A	B	C
1			
2	Home	$845.00	
3	Food	$380.00	
4	Entertainmen	$320.00	
5	Savings	$400.00	
6			

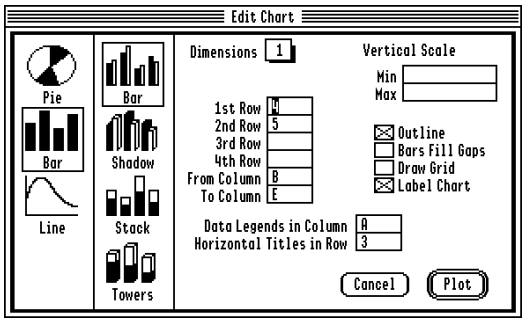
Select the four cells as show, then select New Chart... The titles are assumed to be to the left of columns of data, or above rows of data, although you can change the default. When you plot the chart, the cell labels are used to label the information in the chart, as this tipped, shadowed pie chart shows:



Bar Charts

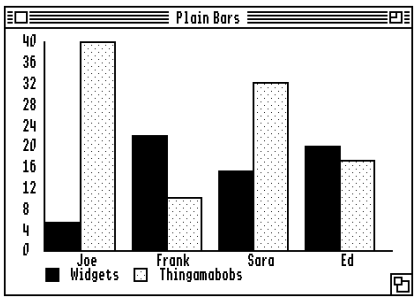
Bar charts are used to compare the relative sizes of values. A typical bar chart might display sales of two different products by four different salesmen, like the information from this spreadsheet:

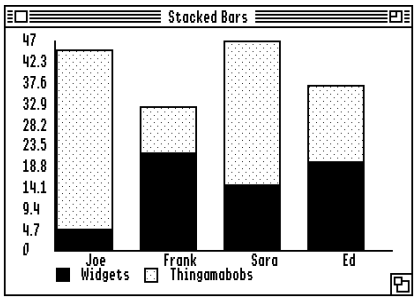
	A	B	C	D	E
1		Joe	Frank	Sara	Ed
2	Widgets	5	22	15	20
3	Thingamab	40	10	32	17
4					



After selecting the cells, using the New Chart... command, and picking the bar chart icon, the Edit Chart dialog shows the options for bar charts. There are four varieties of bar charts, and with minor exceptions noted below, the information used to plot all four bar charts is identical. As with pie charts, the distinction between the various bar charts is in the way the are drawn.

There are two basic ways to draw a bar chart: side by side and stacked. There is no difference between these methods unless you are plotting more that one kind of information. The sales information shown above is a good example. We can plot the information as bar chart data, showing the number of each kind of item each person sold. Here's the information plotted both ways:





Side by side bars, shown on the left, are a great way to compare the relative number of each product being sold. From the chart on the left, it's easy to see that Joe is concentrating on selling thingamabobs at the expense of widgets, and that Ed has the most balanced sales approach. From the chart on the right, where all of the information is stacked, it's easy to see that Sara is selling the most—something that is not clear from the chart on the left.

Both of these charts can be plotted as plain bars, like the charts shown here, or with a 3D shadow effect. Either way, the information is the same.

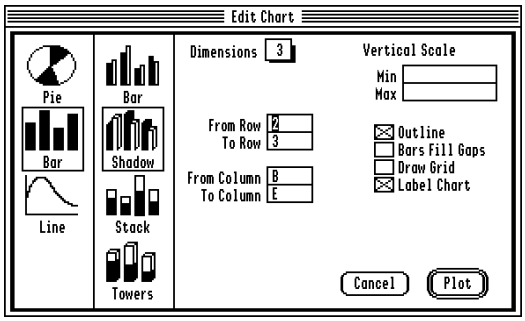
1D Bar Charts

Bar charts can be plotted in a traditional one dimensional form, like those shown above, or a three dimensional form. You select the number of dimensions with the "Dimensions" pop-up menu. This section describes the dialog options for the one dimensional form.

Field	Use
1st Row	This is the row number containing the first set of data to plot. This field must be filled in.
2nd Row	This is the row number for the second set of data to plot. This row does *not* need to come immediately after the first one. This is an optional field.
3rd Row	This is the row number for the third set of data to plot. This is an optional field.
4th Row	This is the row number for the fourth set of data to plot. This is an optional field.
From Column	This is the column number for the first data point to plot from each row. This field must be filled in.
To Column	This is the column number for the last data point to plot from each row. This field must be filled in.
Max	This field gives the maximum vertical value. If you omit this field, the data is scanned for the highest data point, and that value is used for the upper limit of the chart. By setting a manual maximum for the chart, you can adjust the axis for uneven data. For example, in the sales data, the highest value was 40. Setting max to 50 gives a chart that is easier to interpret in terms of units of 10 sold.
Min	This field gives the minimum vertical value. If you omit this field, zero is used for the bottom of the chart. By setting a manual minimum for the chart, you can effectively chop off the bottom of long bars, emphasizing the differences.
Outline	When selected, this option draws a black outline around each bar. When not selected, solid colored bars with no outline are drawn.
Bars Fill Gaps	When selected, this option widens the bars to fill in gaps, so the graph shows a solid wall of bars. When not selected, there is a small gap between adjacent groups of bars.
Draw Grid	When selected, this options draws a set of grid lines behind the bars, making it easier to compare information and read off approximate values from the chart. When not selected, the background is solid white.
Label Chart	When selected, the chart includes horizontal and vertical labels and a color coded legend for multiple data entries. When omitted, these legends are not shown. The following two entries control the source of text information.
Data Legends in Column	This field gives the column number for label cells identifying the different data for the chart. In the sales example, this column contained the names of the items being sold. These names are shown next to color coded boxes that match the colors used in the bars.

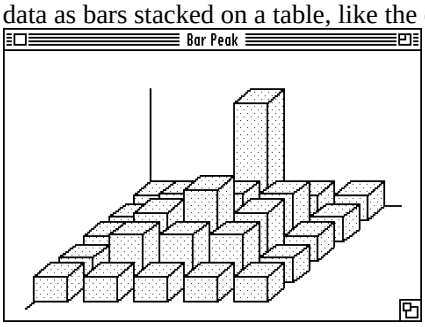
Horizontal Titles in Row	This field gives the row number for labels for the groups of bars. In the sales example, this row contained the names of the sales people.

3D Bar Charts



Bar charts can be plotted in a traditional one dimensional form or a three dimensional form. You select the number of dimensions with the "Dimensions" pop-up menu. This section describes the dialog options for the three dimensional form.

When you select 3 dimensions using the "Dimensions" pop-up menu, the options in the right portion of the dialog change, as shown. The options that do not change work just like they did before. The changed options reflect the basic difference between a normal bar graph and a 3D bar graph. The 3D Bar graph draws a table of data as bars stacked on a table, like the ones in the sample 3D bar graph.



The information used to plot the data is a block of cells. In the sample, the block of cells is five cells wide and five cells high. The value of each cell determines the height of the bar. One way to imagine the way the graph is drawn is to imagine printing the cells, then laying the paper down on a table and stacking blocks on the cells based on the cell value.

3D Bar charts are great for showing the relative proportions of spatial information. For example, plotting the addresses of customers on a map, then entering the number of customers in each cell and plotting the results can help you visualize where a store's customers come from, which could help plan an effective advertising campaign.

The various options in the 3D Bar chart dialog are:

Field	Use
From Row	This is the row number containing the first row of data to plot. This field must be filled in. The data in this row will appear at the back of the 3D bar chart.
To Row	This is the row number for the last row of data to plot. This field must be filled in. The data in this row will appear at the front of the 3D bar chart.
From Column	This is the column number for the first data point to plot from each row. This field must be filled in.
To Column	This is the column number for the last data point to plot from each row. This field must be filled in.

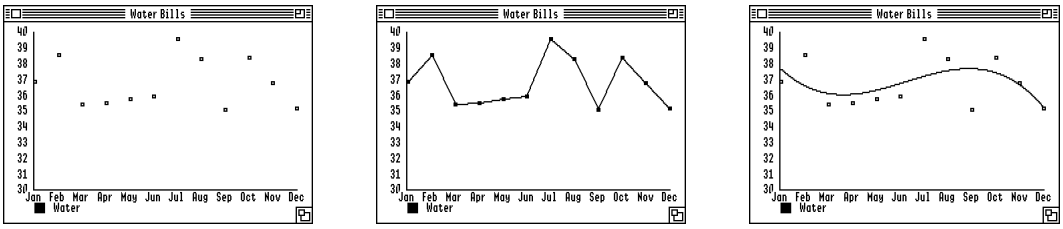
Max	This field gives the maximum vertical value. If you omit this field, the data is scanned for the highest data point, and that value is used for the upper limit of the chart. By setting a manual maximum for the chart, you can adjust the axis for uneven data.
Min	This field gives the minimum vertical value. If you omit this field, zero is used for the bottom of the chart. By setting a manual minimum for the chart, you can effectively chop off the bottom of a set of almost even bars, emphasizing the differences.
Outline	When selected, this option draws a black outline around each bar. When not selected, solid colored bars with no outline are drawn.
Bars Fill Gaps	When selected, this option widens the bars to fill in gaps, so the graph shows the bars touching. When not selected, there is a small gap between bars.
Draw Grid	When selected, this options draws a set of grid lines behind the bars, on the left "wall," and below the bars, making it easier to compare information and read off approximate values from the chart. When not selected, the background is solid white.
Label Chart	When selected, the chart includes numerical values along the axis. When omitted, these legends are not shown.

Line Charts

Line charts are by far the most flexible kind of charts. Line charts treat spreadsheet information as individual data points. You can plot your information in 1, 2 or 3 dimensions. You can plot up to four different sets of data at the same time, too, displaying all of the data on the same color-coded graph. Finally, you can plot the information as individual data points, with lines connecting the data points, or as a least squares fit of the data.

This is all a lot simpler than it might sound, simply because so many of the options are the same for all of the different charts. You can think of all of these different options as variations on a single basic theme: plotting individual data points.

The three basic forms of line graphs are individual data points, connected data points, and fits. The three graphs below show all three of these forms for the same data.



Scattered data points work well then you want to see the individual pieces of information. This is especially useful in two-dimensional graphs where there is more than one data point along the vertical axis. A good example would be plotting height verses weight for the student "body"

of a school to look for a correlation between height and weight, and see graphically just how far individuals might vary from the normal.

Connected data points are the most common kind of graph. They work well for data taken over a period of time. Stock prices over time often show clear trends with this kind of graph. A plot of utility bills over a year can help you decide whether you want to accept the utility company's offer to pay an "average" bill year round, rather than a monthly bill.

A fit to a set of data shows a line that best matches the individual data points. A fit uses a mathematical technique called linear regression to find a line that, roughly speaking, comes closest to all of the data points. This doesn't have to be a straight line, either. In all of the examples cited, using a fit can help visualize trends far better than looking at raw data.

Options for One and Two Dimensional Line Charts

The options for one and two dimensional charts are almost identical. The only difference is that two dimensional charts can only show three sets of data per horizontal value, rather than the four allowed in one dimensional charts; and a two dimensional chart has an extra field for the horizontal axis values.

With one exception, the options are also the same for data, connected line, and fit charts. The only difference is that fit charts have an extra option for selecting the order of the fit.

The table below documents the various options available for one and two dimensional line charts.

Field	Use
Dimensions	You can plot data in 1, 2 or 3 dimensions. This table documents the options for 1 and 2 dimensional charts; see the next section for 3 dimensional charts. One dimensional charts treat the spreadsheet cells as evenly spaced data points, more or less like a bar chart. The value in the cell indicates the Y axis, or vertical offset. Two dimensional charts treat spreadsheet cells as pairs of numbers. With a two dimensional chart you specify the horizontal axis value as well as the vertical axis value. This lets you create unevenly spaced charts, like log graphs. It also lets you display information that isn't a true mathematical function, like a plot of heating bills by month over more than one year, with the bills for the same month superimposed.
Dot Size	You can choose from three dot sizes. Each data point is drawn with the dot size you select.
1st Row	This is the row number containing the first set of data to plot. This field must be filled in.
2nd Row	This is the row number for the second set of data to plot. This row does *not* need to come immediately after the first one. This is an optional field.
3rd Row	This is the row number for the third set of data to plot. This is an optional field.

4th Row	This is the row number for the fourth set of data to plot. This is an optional field. This field is only available with 1 dimensional charts.
H. Values	This field contains the horizontal axis value. The values are paired with the data points in the fields "1st Row," "2nd Row," and "3rd Row." Horizontal values to not need to be ordered in any particular way, and it is legal to use the same horizontal value more than one time. When a line chart is drawn from the data, though, the dots are connected in left to right order. Because of this, you will usually keep the points in order for line charts. This field is only used with 2 dimensional charts.
From Column	This is the column number for the first data point to plot from each row. This field must be filled in.
To Column	This is the column number for the last data point to plot from each row. This field must be filled in.
Max	This field gives the maximum vertical value. If you omit this field, the data is scanned for the highest data point, and that value is used for the upper limit of the chart. By setting a manual maximum for the chart, you can adjust the axis for uneven data.
Min	This field gives the minimum vertical value. If you omit this field, the data is scanned for the lowest data point. If the lowest data point is less than zero, it becomes the lowest value on the graph; otherwise, zero is used for the lowest point on the graph.
Draw Grid	When selected, this options draws a set of grid lines. When not selected, the background is solid white.
Label Chart	When selected, the chart includes numerical values along the vertical axis, the "Data Legends in Column" option is used to create data legends for graphs with more than one set of data, and the "Horizontal Titles in Row" option is used to create horizontal legends. When omitted, these legends are not shown.
Data Legends in Column	Data legends are used to identify which lines or points come from which set of data in a chart that shows more than one set of data. For example, if you are plotting gas, electric, and combined utility bills on a single chart, it is easy to tell which line shows the combined utility bills, but not so easy to tell gas from electric. By placing the cell labels "Gas," "Electric," and "Combined," in, say, column A on the appropriate rows in the spreadsheet and entering A into this LineEdit item, you create labels at the bottom of the spreadsheet with these names. Each label is color coded, matching the color of one set of data in the chart. This option doesn't do anything unless "Label Chart" is selected.
Horizontal Titles in Row	Horizontal titles are drawn along the horizontal axis. These can be numeric values or text from cell labels. For example, if you are

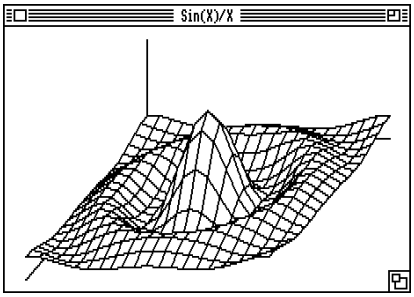
plotting utility bills by month, you can use the name of the month as a label.

This option doesn't do anything unless "Label Chart" is selected.

Curve — This option is only used with curve fits. It lets you pick between a first, second or third order fit.

A first order fit is a straight line, fitting the data to the equation of the form $y = A + Bx$. A second order fit has a single bend, fitting the data to an equation of the form $y = A + Bx + Cx^2$. A third order fit has two bends, fitting the data to an equation of the form $y = A + Bx + Cx^2 + Dx^3$.

Options for Three Dimensional Line Charts



Three dimensional charts show information plotted in three dimensions using X, Y and Z values for each data point. Point plots don't work well with three dimensional charts; it is difficult to see the spatial relation on a flat screen when you only have points to examine. For line and fit charts, though, a three dimensional chart plots as a surface, and with many kinds of data, it is easy to see the overall relationship between the information.

There is no option for the order of the fit for a 3 dimensional fit chart. In all cases, the data is fit to an equation of the form $Z = A + Bx + Cy + Dxy$.

The options for one and two dimensional charts are covered above.

The table below documents the various options available for three dimensional line charts. As you read the field descriptions, keep in mind that a 3 dimensional plot shows an array of data points. Stepping from left to right across the values in the spreadsheet is equivalent to stepping from low to high horizontal axis (X axis) values. Stepping from the bottom row to the top in the spreadsheet is equivalent to moving from the front to the back along the depth axis (Y axis) in the chart. The values in the spreadsheet cells correspond to the vertical axis (Z axis) in the chart.

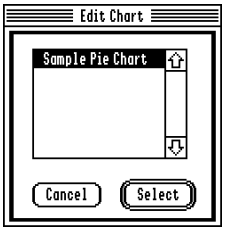
Field	Use
Dimensions	You can plot data in 1, 2 or 3 dimensions. This table documents the options for 3 dimensional charts; see the previous section for 1 and 2 dimensional charts.
D. Values	This field contains the depth axis (Y axis) column. The values are paired with the data points in the various rows of the array of spreadsheet data. This field can be left blank. If blank, the rows are assumed to be evenly spaced.
From Row	This is the row number containing the first row of data to plot. This field must be filled in. The data in this row will appear at the back of the chart.

To Row	This is the row number for the last row of data to plot. This field must be filled in, and must be larger than "From Row." The data in this row will appear at the front of the 3D bar chart.
H. Values	This field contains the horizontal axis row. The values are paired with the data points in the various columns of the array of spreadsheet data. This field can be left blank. If blank, the columns are assumed to be evenly spaced.
From Column	This is the column number for the first data point to plot from each row. This field must be filled in.
To Column	This is the column number for the last data point to plot from each row. This field must be filled in, and must be larger than "From Column."
Max	This field gives the maximum vertical value. If you omit this field, the data is scanned for the highest data point, and that value is used for the upper limit of the chart.
Min	This field gives the minimum vertical value. If you omit this field, the data is scanned for the lowest data point. If the lowest data point is less than zero, it becomes the lowest value on the graph; otherwise, zero is used for the lowest point on the graph.
Draw Grid	When selected, this options draws a set of grid lines. When not selected, the background is solid white.
Label Chart	When selected, the chart includes numerical values along the axis. When omitted, these values are not shown.

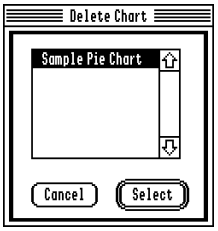
Edit Chart...

Edits an existing chart. This command is available whenever a spreadsheet window with existing charts is frontmost.

Edit Chart... brings up the chart selection dialog. Select a chart from the list of charts and press OK to edit the chart. You will get the same chart creation dialog presented by the New Chart... command, with all of the current information for the selected chart filled in.



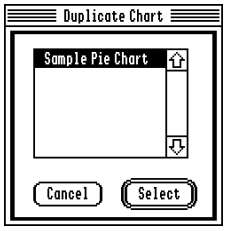
Delete Chart...



Deletes an existing chart. This command is available whenever a spreadsheet window with existing charts is frontmost.

Delete Chart... brings up the chart selection dialog. Select a chart from the list of charts and press OK to delete the chart.

Duplicate Chart...



Duplicates an existing chart. This command is available whenever a spreadsheet window with existing charts is frontmost.

Duplicate Chart... brings up the chart selection dialog. Select a chart from the list of charts and press OK to duplicate the chart. You will get the same chart name dialog presented by New Chart... to name a chart. Type in a chart name and select OK. A copy of the original chart is made with a new name.

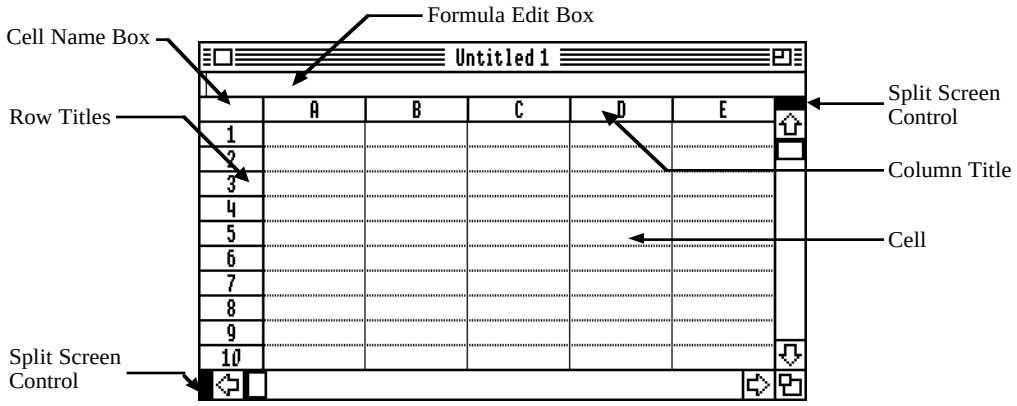
Next, the Edit Chart dialog is displayed, giving you a chance to make changes to the copied chart right away. Press Cancel if you don't want to make changes at the current time—the copied chart is still created. If you make changes and press OK, the modified copy is drawn.

The Spreadsheet Window

The spreadsheet window supports a number of mouse and keyboard options beyond those in a generic document window. This section describes the things that you can do from the spreadsheet window that are not possible from a standard document window.

Topics like closing, sizing and moving windows; using scroll bars; and selecting windows are not covered here. For information about these general topics, see Apple's System Disk manuals.

Parts of a Spreadsheet Window



The spreadsheet window shows a group of cells in white, separated by gray lines. Each cell works like a little calculator or note pad. You can type text, enter a number, or create a formula in each cell.

The white area across the top of the spreadsheet is the formula box. You type here to enter or edit information in a cell.

The yellow boxes across the top and down the left of the spreadsheet are the title bars. These titles, taken together, tell you the name of each cell. You use the name to specify which cell you want when entering formulas. For example, the cell below the title C, and to the right of the title 4 is called cell C4. The formula =C4+3 causes a cell to add 3 to whatever is in cell C4, and display the result.

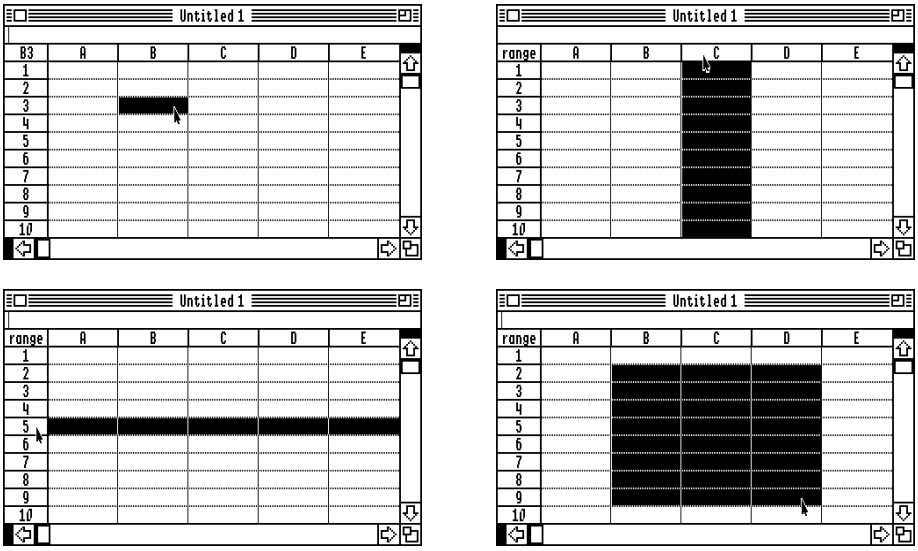
The small white box in the corner formed by the titles is the cell name. It shows the name of the currently selected cell, even if the window has been scrolled so the cell is not visible. It shows "range" if more than one cell is selected, and is blank if no cells are selected.

Scroll bars and a grow box appear along the bottom and right of the window. These work just like the scroll bars in any desktop window.

The black boxes to the left of the horizontal scroll bar and above the vertical scroll bar are split screen controls. With these controls, you can split the screen, creating pairs of scroll bars that can scroll to separate portions of the same spreadsheet. Split screen controls are covered below.

Selecting Cells

Before you can enter information in a cell, delete a column, or perform many of the other menu commands listed earlier in this chapter, you must select one or more cells.



To select a single cell, click on the cell. The selected cell will invert, and the cell name will appear in the cell name box. When any cell is selected, you can use the four arrow keys to move to an adjacent cell.

△ **Important** Clicking on a cell to select the cell doesn't work if you are editing a cell formula. See "Using the Mouse to Enter Cell Names," later in this chapter, for details. △

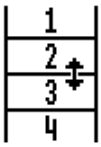
Some operations, like insert and delete, are designed to work on columns or rows of cells. You might also want to select a complete column or row to change the formatting information for a list of cells. To select a column, click on the column name. To select a row, click on the row name.

You can select more than one cell, row or column two different ways. The first way is click-and-drag. To select multiple cells this way, start with your initial selection, but hold the mouse down. Drag the mouse in any direction to select cells. The spreadsheet will scroll as necessary to keep up with your selections.

Another way to select multiple cells is to start with an initial selection by clicking, just like you only intend to select one cell, row or column. Holding the shift key, click on another cell, row or column, and everything from the initial selection to the final selection is selected. This method works particularly well when you are selecting a large number of cells, since you can use the scroll bar's thumb and page regions to scroll through the spreadsheet more quickly than the spreadsheet will scroll when you drag-select cells.

You don't want any cells selected when printing the entire spreadsheet or when setting default format options for the spreadsheet. When you click on the cell name box at the top, left of the spreadsheet, all cell selections are removed, so no cells remain selected.

Changing the Size of Cells



Spreadsheet cells start off the right size for about ten characters using the default font. As you change the font and put different kinds of information in the cells, you'll want to adjust the size of the various cells to fit the information they contain.

You can change the size of cells using the Column Width... and Row Height... menu commands, covered earlier in this chapter, but it's usually a lot easier to adjust a cell using the mouse. To adjust a cell using the mouse, move to the title area. When the mouse is over the dividing line between two cell titles, the cursor changes to a pair of arrows, indicating that you can adjust the cell size. Dragging the bar changes the size of the cell.

Using the Formula Entry Box

Note "Entering Spreadsheet Values and Labels" in Chapter 4 covers what to put in a spreadsheet cell. This section covers how to use the mouse and keyboard.

Any time a cell or range of cells is selected, the contents of the top left selected cell are shown in the formula entry box. For cell labels, the value shown is the same set of characters typed to label the cell in the first place. The original text is also shown for cell constants and formulas, rather than the value. If the cell is empty, the formula box is also empty, but there will be an active, flashing cursor. When cells are selected, the formula box is active; at all other times it is inactive. The rest of this section assumes the formula entry box is active.

The formula entry box is an LineEdit item, just like the ones in dialogs, and supports all of the line editing commands you are used to—plus a few extras specific to the spreadsheet. In particular, the formula entry box supports cut, copy and paste for moving text between formulas or to and from scrapbooks. It also supports all of the normal mouse commands for setting the cursor position and selecting text, and it supports all of the normal editing keys except the four cursor (arrow) keys.

Using the Mouse to Enter Cell Names

Whenever you are entering text in a cell you can click on a cell in the spreadsheet, and the name of the cell is entered in the formula box. If the character right before the cursor is a number, a + character is placed right before the cell name. That additional feature makes the most common spreadsheet formula—adding the values of several cells—particularly easy. The create a formula that adds several cells together, type an = character to start the formula, then click on each of the cells.

The scroll bars remain active while you are entering a formula, so you can scroll around in the spreadsheet to find various cells, clicking on them as needed.

You can also drag-select cells while you are typing a formula. When you drag over multiple cells, the cells are entered in the formula as a range of cells. For example, if you press on B2 and drag to D7, B2:D7 will appear in the formula entry box.

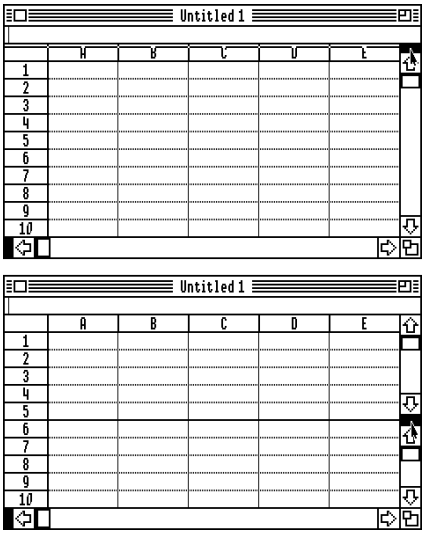
Special Editing with the Cursor Keys

The four cursor keys always move from one cell to another, even when you are in the middle of entering a formula. When you press an arrow key, the text you have typed is entered into the cell right away. Assuming there is no error, the selected cell then moves one cell in the direction of the key's arrow. For example, to enter a series of horizontal values, you can type a value, press the right arrow, type another value, and so forth. This saves a keystroke for each cell, which can speed things up quite a bit.

The Return and Enter Keys

In addition to the four arrow keys, pressing Return or Enter enters the text into the cell. The two keys are not identical, though. The Enter key leaves the original cell selected, while the Return key moves down one cell after the text is entered in the cell. The Return key is handy for entering a column of data, while the Enter key is nice when you are trying numbers while working through a "what if" problem with the spreadsheet.

Split Screen



Split screens let you split the spreadsheet into pieces, both horizontally and vertically.

For example, in a checkbook, you would put a row of header titles across the top of each column containing titles like "Written To" or "Amount." As you scroll through the spreadsheet, you want to keep the column headers visible, no matter how far down you go. By putting the column headers in row 1 and splitting the screen right below the headers, you create two separately controlled areas. You can scroll up or down in the bottom area, containing the various checks, with no effect on the top area, which has the headers.

Another way to use split screens is to compare information in two widely separated parts of the spreadsheet.

The split screen controls are the black rectangles to the left of the horizontal scroll bar and above the vertical scroll bar. These controls are missing if the window is too small to split.

To split the screen, grab the split screen control with the mouse and drag it to the location where you want the split to appear. The screen will be split by a solid black line. Assuming

there is enough room, a scroll bar will appear on each side of the split screen control, and the split screen control itself will move to the location of the split. Each scroll bar works independently of the other, scrolling each area in any direction as far as you care to move.

To get rid of a split screen, drag the split screen control to either end if the screen.

Chapter 4 – Contents of a Cell

This chapter is a technical reference to cells—how to enter values, how to create functions, and a catalog of the various functions available in Quick Click Calc.

The chapter is organized for easy reference, not as a tutorial. For an introduction to the various capabilities of Quick Click Calc, see Chapter 2. Refer to this chapter to find details about entering values and for a complete list of the spreadsheet's functions and how to use them.

This chapter has three parts.

"Entering Spreadsheet Values and Labels" tells how to enter things in a spreadsheet cell. It explains all of the ways to enter a numeric constant, how to enter text as a cell label, and how to create expressions that calculate values based on the contents of another cell.

"Functions by Category" lists all of the built in functions, like financial and mathematical operations. In this section, the functions are listed by category, with a brief line describing what the function does. This is a good section to use when you know what you want to do, but don't know the name of the Quick Click Calc function that will do what you want.

"Function Reference" is a complete list of all of the functions in Quick Click Calc in alphabetical order. Each function is completely described, with examples. In many cases, the examples show how to solve real-world problems with Quick Click Calc.

Entering Spreadsheet Values and Labels

Note "Using the Formula Entry Box" in Chapter 3 covers how to use the mouse and keyboard to enter information in a cell. This section tells what to put in a spreadsheet cell.

Any time a cell is selected, you can enter information in the cell by selecting the formula box and typing. The information you enter can be a string, generally used to label information in a spreadsheet; a formula, which can calculate a value based on the contents of other cells; or a constant, which can take one of several forms. The sections below cover the overall format for each of these types of information.

Cell Labels

Cell labels are used to label information in a spreadsheet. They are text entries, like the name of a student or a label identifying what is in a column of numbers.

You can enter any text characters in a cell label. In some cases, though, your label might be confused with a constant or formula—especially since so many different kinds of constants are accepted! The rules used by the spreadsheet to tell the difference between a cell label and the various forms of constants and expressions are fairly complicated. There is one simple way to make sure what you type will be interpreted as a constant, though: Use a leading " character. As

long as the first character you type is “, everything after that character is treated as a cell label. The “ character will not be displayed.

△ **Important** Since “ has special meaning when it is used as the first character in a cell, you must use two “ character to start a cell label with a “ character. △

As for the complicated rules for telling the difference between a cell label and some other cell entry, they are:

- Anything that starts with a +, - or a numeric digit is a numeric constant.
- Anything that fits the rules for a date, time or grade constant is a numeric constant.
- Anything that looks like an expression is treated as an expression.
- Anything that starts with an = character is treated as an expression.

☆ **Tip** If you type something you intended to be a label, and a strange number shows up in the cell, it’s because the string was interpreted as a constant. For example, if you label some columns as A, B and C, you will see the numbers 4, 3 and 2, since these strings happen to be grade constants. When this happens, select the cell and add a “ character at the start of the string. ☆

Examples of cell labels are:

Fred Smith
“January 1st, 1994
Taxes Due:
“7

Numeric Constants

Numeric constants are cells with a single numeric value. Numeric cells are used for individual numbers, like data points from an experiment or amounts from checks.

The easy way to think of a numeric cell is anything you would normally write as a number.

The technical rules are a but more involved. Numeric constants can start with a + or - character. This is followed by one or more numeric digits (‘0’ to ‘9’). Next, you can encode a decimal point followed by one or more decimal digits. Finally, you can encode an exponent, which is the letter e or E followed by an optional + or - character and one or more numeric digits.

Examples of numeric constants are:

300	4.65	+7	-320000	1e-10
4.567E6	3.14159	123E+100	0	

Date Constants

Date constants give you an easy way to enter dates and perform math on the result. When you enter a date constant, the date is converted to a number. If you add a value to the date, the result is the numeric form of a different date.

For example, let's say you enter the date

July 4th, 1776

in cell C4. In another cell, you enter the formula

=C4+1

The result is the numeric value for July 5th, 1776.

△ **Important** A date is a special form of a numeric constant, and it's displayed that way. When you first enter a date, it shows up as a number. Use the Cell Attributes... command to change the format to one of the date formats. △

To enter a date, type the date with no leading characters. Quick Click Calc supports the following formats for dates:

template	examples	date
mm/dd/yy	6/27/55	June 27th, 1955
	12/25/94	December 25th, 1994
	7/4/1776	July 4th, 1776
day month year	27 Jun 55	June 27th, 1955
day month, year	25 Decem, 94	December 25th, 1994
	4 July, 1776	July 4th, 1776
month day year	Jun 27, 1955	June 27th, 1955
month day, year	Decemb 25, 94	December 25th, 1994
	July 4, 1776	July 4th, 1776

For months, you must enter at least the first three characters of the name of the month. You may enter as many other characters as you like, but all characters entered must be correct. The case of the letters does not matter.

In all cases, when a year is less than 100, 1900 is added.

Note The internal numbers used by Quick Click Calc give accurate dates for the entire range of the modern Gregorian calendar, used in most of the world today. History buffs are aware that the Julian calendar, which the Gregorian calendar replaced, wasn't universally accepted until fairly recently. If you are using the spreadsheet for historical calculations—for example,

computing the number of days between historical dates—be sure all dates are expressed using the Gregorian calendar.

Time Constants

Time constants give you an easy way to enter times and perform math on the result. When you enter a time constant, the time is converted to an internal number. If you add a value to the time, the result is the numeric form of a different time.

For example, let's say you enter the time

6:30:00

in cell D4. In another cell, you enter the formula

=D4+45

The result is the numeric value for 7:15.

△ **Important** A time is a special form of a numeric constant, and it's displayed that way. When you first enter a time, it shows up as a number. Use the Cell Attributes... command to change the format to Time. △

A time is one or more numeric digits (the hour), a colon, one or more numeric digits (minutes), a second colon, and a third set of digits (seconds):

hh:mm:ss

Times are converted to numbers by multiplying the minutes by 60, the hours by 3600, and adding these two numbers to the seconds field.

☆ **Tip** Quick Click Calc isn't picky about the actual values in the time fields. If you want to enter a time as 90 seconds, 0:0:90 will work just fine. When you display the time, the value shows up as 00:01:30. ☆

Grade Constants

Grade constants give you an easy way to enter student grades and perform math on the result. When you enter a grade constant, the grade is converted to a number based on a 4 point grading system.

To enter a grade, enter the letter, optionally followed by a + or -. The case of the letter is not important; B+ and b+ both work just fine.

For example, let's say you enter the grades

A- B B+ C

in cells E4 through H4. In another cell, you enter the formula

=Avg(E4:H4)

The result is the numeric value for B.

△ **Important** A grade is a special form of a numeric constant, and it's displayed that way. When you first enter a grade, it shows up as a number. Use the Cell Attributes... command to change the format to Grade. △

Grades are converted to numbers based on the table below. When converting from a number back to a letter grade, the numeric value is rounded to the closest letter grade. A grade of F+ or F- is displayed as F.

Grade	Value
A+	$4\ 1/3$
A	4
A-	$3\ 2/3$
B+	$3\ 1/3$
B	3
B-	$2\ 2/3$
C+	$2\ 1/3$
C	2
C-	$1\ 2/3$
D+	$1\ 1/3$
D	1
D-	$2/3$
F+	$1/3$
F	0
F-	$-1/3$

Formulas

An formula cell is a computed value that generally involves more than one numeric value, some of which are values from other cells. Any cell can be used as a term in a formula.

There are two distinct kinds of values that can appear in expressions, and can be the result of an expression. The most common is a numeric value, like 4.5. The other kind of value is a string. In general, expressions involving strings and expressions involving numbers are quite different, and they will be discussed separately here. There are functions to convert from numbers to strings and strings to numbers, though, and using these functions, you can mix strings and numbers in the same expression.

String Formulas

String formulas use strings for arguments and string functions to operate on the strings. The result is a string, which looks and works like a label cell. For example, you might use a string formula to build a complicated label, like this:

=Concat("Grades for ", B5)

There are no operations for strings, like the + or * operators for numbers. Functions are always used to manipulate strings. You can find detailed descriptions of the string functions, along with examples showing how to use them, in "Function Reference," later in this chapter.

Numeric Formulas

Numeric formulas involve one or more numbers and the standard math operations, as well as mathematical functions. The various operators appear either before a number, as in the - sign, or between numbers. One operator, the % operator, even appears after the number it operates on. The expression is evaluated left to right.

For example, the formula

1 + Abs(-2)*3

returns 9. Working from left to right, 1 + Abs(-2) is 3, and 3*3 is 9.

There are dozens of functions available, and they perform a wide variety of operations. The functions are covered in "Function Reference," later in this chapter.

The various operators you can use in a function are shown below.

operation	meaning
+	When used before a number, this operator does nothing. It indicates that a number is positive, but then, numbers are positive by default. When used between numbers, + adds the two numbers.
-	When used before a number, this operator changes the sign of the number.

When used between numbers, - subtracts the number to the right from the number to the left.

*	Multiplies the number to the left and the number to the right.
/	Divides the dumber to the left (numerator) by the number to the right (denominator).
^	Raises the number to the left to the power of the number to the right. For example, 2^3 is the same as 2*2*2, which is 8.
<>	Returns 1 (true) if the number to the left is not equal to the number to the right, and 0 (false) otherwise.
=	Returns 1 (true) if the number to the left is equal to the number to the right, and 0 (false) otherwise.
<	Returns 1 (true) if the number to the left is less than the number to the right, and 0 (false) otherwise.
<=	Returns 1 (true) if the number to the left is less than or equal to the number to the right, and 0 (false) otherwise.
>	Returns 1 (true) if the number to the left is greater than the number to the right, and 0 (false) otherwise.
>=	Returns 1 (true) if the number to the left is greater than or equal to the number to the right, and 0 (false) otherwise.
$	The dollar operator doesn't really do anything, but it helps you remember what is happening in a formula. You can use $ before any number, as in $3.25.
%	This operator appears *after* a number. It converts a number to a percentage by dividing the number by 100. For example 17% is the same as 0.17.
( )	Parenthesis can be used in pairs to group calculations, changing the order in which they are performed. For example, 1+2*3 is 9, but 1+(2*3) is 7.

Boolean Values

In many situations a value is either true or false, rather than a number. For example, when you use the IF function to select an alternative, there is a condition that is either true or false. In most cases, you'll use a boolean function or one of the operators that returns a boolean result. For example, if you want to prevent a number from being negative, you might use the expression

```
if (D4 < 0, 0, D4)
```

This expression tests the value in cell D4 to see if it is less than zero. If so, the function returns the second value, 0. If D4 is not less than zero, the function returns the value in D4.

While you will usually distinguish between a boolean value of true or false and a number by the way you use the values in an expression, Quick Click Calc doesn't need two different kinds of value to keep boolean values and numbers straight. As far as the program is concerned, any number can be used as a boolean value, and vice versa. Any function or operation that returns true returns the number 1, and any boolean function or operation that returns false returns the number 0. When you use a number as a boolean value, 0 is treated as false, and any other number is treated as true.

☆ **Tip** The way boolean values and numbers are used interchangeably is sometimes very useful. For example, if you have a series of boolean results in cells D1 to D100—test results, perhaps—you can count the number of true values very quickly with the expression Sum(D1:D100). ☆

Cell Ranges and Lists

Many functions let you enter a list. The list might be a string list, like CONCAT, or it might be a list of numbers, as in SUM. The list is a very flexible way of entering numbers. Unless the description of the function says otherwise, all of the methods described in this section work with each function that accepts a list.

The list is made up of one or more entries separated by commas. Each entry can be a number (or string, for a string function), the name of a cell, or a range of cells.

A range of cells is a cell name, a colon, and another cell name. The two cells form the corners of a rectangle of cells, and all of the cells in the rectangle are used. Here are a few examples of cell ranges and the cells they include:

range	cells in the range
D4:D7	D4, D5, D6, D7
C2:F2	C2, D2, E2, F2
A1:C3	A1, A2, A3, B1, B2, B3, C1, C2, C3

All of the values in the list are used by the functions that work on lists. For example, SUM adds all of the numbers in a list, so

Sum(A1, 3, C2:C4)

adds 3 and the cell values in cells A1, C2, C3 and C4.

In most cases, if a function can't use a value in a cell, it uses a reasonable substitute. SUM uses the value 0 for any cell that doesn't have a value; PRODUCT, which multiplies cell values, uses 1. In both cases, the way an unusable cell is treated has the smallest possible impact on the cells that can be used. If you need to know the exact rules, see the documentation for the function, but in general, things just work the way you would expect—and there's no real need to get more technical than that!

Fixed Cells

You can use the $ character before the column or row name of a cell to force the cell reference to remain fixed as the spreadsheet is updated.

As you move formula cells around using Copy and Paste, insert and delete columns and rows, fill ranges of cells with the Fill Down command, and do all of the other editing that comes natural as you create and manipulate spreadsheets, the cells formulas refer to change. As this happens, Quick Click Calc does its best to update the cell references by adjusting the cell names in formulas.

For example, if a formula refers to cell C3 and you delete column B, the information that was in cell C3 ends up in cell B3. The formula that contained the reference to cell C3 is automatically updated by changing the cell name from C3 to B3.

There are some situations where you don't want this to happen. For example, a calculation showing principal on a loan by month might be arranged as a series of formula cells, each of which calculates the new principal based on the principal from the month before, appearing in the cell above, and an interest rate, which appears in a fixed cell. It's natural to create the column of formulas using the Fill Down command. Updating the cell reference to the cell above is done automatically, but the reference to the interest rate is also updated as the formula is moved down, and that's not what is needed.

Let's assume that the interest rate is in cell C1, and the initial principal is in cell B1. The formula

= B1*C1 - $800

in cell B2 calculates the new principal after accruing interest for one month and making a payment of $800. Selecting cells B2 and B3 and filling down gives this formula in cell B3:

= B2*C2 - $800

That's almost what we want. Cell B2 contains the most recent principal, which is what we want to use in this formula from cell B3. The interest rate is in cell C1, though, not cell C2.

What we need is a way to keep the reference to cell C1 fixed as the formula is adjusted by the Fill Down command. Placing a $ character before the 1 fixes the cell row. Using the formula:

= B1*C$1 - $800

in cell B2 and filling down gives:

= B2*C$1 - $800

in cell B3.

You can also use a $ before the column name of a cell, or even use the $ character before both the column and row.

Functions by Category

Mathematics

ABS	Absolute value
ACOS	Arc cosine
ASIN	Arc sine
ARCTAN2	Two-argument arc tangent
ATAN	Arc tangent

AVG	Return the average of a list of numbers
COS	Cosine
DEG	Convert radians to degrees
EXP	Exponent
FRAC	Returns the fractional part of a number
INT	Returns the whole part of a number
LN	Natural logarithm
LOG	Base 10 logarithm
MOD	Remainder
PRODUCT	Returns the product of a list of numbers
RAD	Convert degrees to radians
RANDOM	Random number
ROUND	Round to the closest number
SGN	Sign of a number
SIN	Sine
SQRT	Square root
STDV	Standard deviation
SUM	Add a list of numbers
TAN	Tangent
VAR	Variance

Financial

FV	Future value
IRR	Internal rate of return
NPV	Net present value
PMT	Periodic payment
PV	Present value
RATE	Interest rate
TERM	Number of periods for a periodic payment

Miscellaneous Functions

ALERT	Present an alert

Strings

ASC	Return the ASCII value for a character
CHR	Convert a number to a character
CONCAT	Concatenate strings
LEN	Returns the number of characters in a string
LOWER	Convert a string to lowercase
POSITION	String search
PROPER	Converts a string to lowercase with a leading uppercase letter
STRING	Convert a number to a string
SUBSTR	Return a portion of a string
UPPER	Convert a string to uppercase
VAL	Convert a string to a number

Dates

DATE	Returns the date string for a number
DAY	Return the day of month from a date string
MONTH	Returns the month from a date string
NUMDATE	Returns the numeric equivalent for a date
TODAY	Today's date
WEEKDAY	Return the weekday for a date string
YEAR	Return the year from a date string

Boolean Functions

AND	Logical and of a list of values
IF	Return one of two values based on a condition
ISBLANK	Checks to see if a string is empty
ISEMPTY	Checks to see if a cell is empty
ISERROR	Checks to see if a cell returns *Error*
ISNA	Checks to see if a cell returns N/A
ISNUMBER	Checks to see if a cell contains a number
ISSTRING	Checks to see if a cell contains a string
NOT	Boolean negation
OR	Logical or of a list of values

Picking, Counting & Selecting Cells & Values

CHOOSE	Pick one item from a series
COUNT	Counts the number of values in a range of cells
HLOOKUP	Return a value from a horizontal table
MAX	Returns the largest number in a list
MIN	Returns the smallest number in a list
VLOOKUP	Return a value from a vertical table

Constants

ERROR	*Error* constant
FALSE	Boolean constant for false
INF	Infinity
NA	N/A constant
NULL	Null string constant
PI	Numeric constant; approximately 3.14159
TRUE	Boolean constant for true

Function Reference

ABS (number)

Returns the absolute value of the number.

Examples

Expression	Returns
Abs(-4)	4
Abs(7.3)	7.3

ACOS (number)

Returns the arc cosine of the number.
The number must be in the range -1 to 1. If it is not, ACOS returns *Error*.
The result is an angle expressed in radians. It will be in the range 0 to π.

Examples

Expression	Returns
ACos(5/4)	0.64350

ALERT (string)

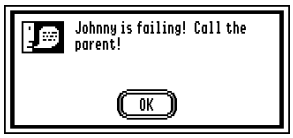
Displays an alert with *string* as the text of the alert. ALERT always returns the number 0 as a result.

ALERT is usually used to flag an error condition. For example, if you want to be warned if a student is failing, you could use an expression like:

```
if(C6 = 0, Alert(Concat(A6, " is failing!  Call the parent!")), 0)
```

In this example, the cell A6 would contain the name of the student, and the cell C6 would contain the grade. The numeric value of an F is 0, so the expression checks to see if the cell C6 is zero. If so, the student is failing, and the first expression is evaluated. The first expression is an alert. If C6 is not zero, the student is not failing, and the second condition is evaluated. That one just returns zero.

The alert itself uses the CONCAT function to build a string. Cell A6 contains the students name; this is combined with the string constant to create a custom string for the alert. If C6 is 0, and A6 contains the label Johnny, you would see this alert:



To get rid of the alert, click on OK or press the return key.

AND (number-list)

Returns TRUE if all of the numbers in the list are true, and FALSE if any one of the numbers is not true.

In most cases, you'll use AND on cells or expressions whose value is created with another logical function or a comparison operator, like AND(A3<0, B3>0). AND happens to work fine on numbers, though. Zero is treated as FALSE, and any other number works like TRUE.

Examples

Expression	Returns
And(TRUE, FALSE)	0 (FALSE)
And(FALSE, TRUE)	0 (FALSE)
And(FALSE, FALSE)	0 (FALSE)
And(TRUE, TRUE)	1 (TRUE)
And(TRUE, 4, -5)	1 (TRUE)

ASIN (number)

Returns the arc sine of the number.
The number must be in the range -1 to 1. If it is not, ASIN returns *Error*.
The result is an angle expressed in radians. It will be in the range $-\pi/2$ to $\pi/2$.

Examples

Expression	Returns
ASin(5/3)	0.64350

ARCTAN2 (number1 , number2)

Returns the arc tangent of the first number divided by the second. In most cases, it's more convenient to think of the angle as the angle between the X axis and the line connecting the points (0, 0) and (number1, number2) on a Cartesian coordinate plane.

The result is an angle expressed in radians. It will be in the range $-\pi$ to π.

▲ **Warning** In most spreadsheets, the name of this function is ATAN2. In Quick Click Calc, ATAN2 is a legal name for a spreadsheet cell, so the longer form of the name is used. ▲

Examples

Expression	Returns
ArcTan2(4,3)	0.64350

ASC (string)

Returns the ASCII value for the first character in a string. The result is a number.

Examples

Expression	Returns
Asc("A")	65
Asc("Hello")	72

ATAN (number)

Returns the arc tangent of the number.

The result is an angle expressed in radians. It will be in the range $-\pi/2$ to $\pi/2$.

Examples

Expression	Returns
ATan(3/4)	0.64350

AVG (number-list)

Returns the average of a list of numbers.

Blank cells, label cells, and cells that evaluate to a string are ignored by AVG.

Examples

Expression	Returns
Avg(1, 2, 3, 4)	2.5

CHOOSE (number, list)

Returns one item from a series of items.

Number is the number of the item to select from *list*, counting from 1. *List* is one or more constants, cells, or cell ranges. CHOOSE scans all of the items in the list. For cell ranges, CHOOSE ignores empty cells and labels, counting all cells in the range that contain a constant or formula. CHOOSE returns the value of the constant or cell selected by *number*.

The result of CHOOSE is a string if the value selected is a formula returning a string. In all other cases, CHOOSE returns a number.

Examples

Expression	Returns
Choose(2, 1, “two”, 3)	“two”
Choose(1, 1, “two”, 3)	1

CHR (number)

Returns the character for an ASCII numeric value. The result is a string containing a single character.

Examples

Expression	Returns
Chr(97)	“a”
Chr(Asc(“A”)+4)	“E”

CONCAT (string-list)

Combines all of the strings in a list into a single string, returning the result.

CONCAT can use string constants, individual cells, or ranges of cells as input. For cells, CONCAT converts numeric constants and numeric formula results to a string.

If the resulting string is longer than 255 characters, it is truncated. The first 255 characters are returned, and all other characters are ignored.

Examples

Expression	Returns
Concat("Report for ", A3)	"Report for January" (assuming cell A3 contains the label January)

COS (number)

Returns the cosine of the number.

The number must be an angle expressed in radians. If the absolute value of the angle is very large, the answer will not be accurate.

☆ **Tip** Use the RAD function to convert an angle from degrees to radians. ☆

Examples

Expression	Returns
Cos(Rad(45))	0.70711

COUNT (number-list)

Returns the number of numeric values in a list.

Blank cells, label cells, and cells that evaluate to a string are not counted by COUNT. If a parameter is not a cell or range, it must be a number.

Examples

Expression	Returns
Count(B3:F10)	Number of cells in the range containing a numeric constant or an expression that returns a number.

DATE (number)

Returns the date string for a number.

DATE returns the same string that is displayed by the Long Date format option.

Dates are numbered from January 1st, 0.

See also DAY, MONTH, NUMDATE, TODAY, WEEKDAY and YEAR.

Examples

Expression	Returns
Date(728471)	"June 27, 1994"
Date(NumDate("4 Jul 94")+31)	"August 4, 1994"

DAY (string)

Returns the day of the month for a given date string.

The date is given as a string, and follows the same rules as string date constants. (See "Date Constants," earlier in this chapter.)

See also DATE, MONTH, NUMDATE, TODAY, WEEKDAY and YEAR.

Examples

Expression	Returns
Day("5/4/94")	4
Day("July 4, 1776")	4

DEG (number)

Converts a number from radians to degrees.

☆ **Tip** Computers like to deal with numbers in radians, but most people think about angles in terms of degrees. Use DEG to convert the radians the computer returns to the degrees you are familiar with. ☆

Examples

Expression	Returns
Deg(3.1415926535)	180
Deg(ACos(Sqrt(2)/2))	45

ERROR

Returns the value *Error*.

☆ **Tip** Use ERROR when a cell contains an impossible value. For example, if you are tracking average running times for a track meet, you could use the

formula IF(B3<=0, ERROR, B3) to indicate an error when a value is not entered correctly. ☆

Examples

Expression	Returns
ERROR	*Error*

EXP (number)

Returns the exponent of a number.

Examples

Expression	Returns
Exp(1)	2.71828
Exp(3*ln(2))	8

FALSE

FALSE is a constant that returns the numeric value 0. FALSE is generally used in logical expressions, like the operand for an IF or AND function, but it's perfectly legal to use it in mathematical expressions, too.

Examples

Expression	Returns
FALSE	0

FRAC (number)

Returns the fraction part of a number.

Examples

Expression	Returns
Frac(1)	0
Frac(6.123)	0.123
Frac(-3.12)	-0.12

FV (payment-number , rate-number , term-number)

Returns the future value of a periodic investment.

FV calculates the future value of a fixed, periodic investment. *Payment-number* is the amount of the periodic investment. *Rate-number* is the interest rate, expressed either as a percentage, like 8%, or a decimal number, like 0.08. *Term-number* is the number of periods.

For example, if you deposit $1000 each year for 20 years in a college fund at 8% interest, FV($1000, 8%, 20) tells you the amount in the fund at the end of the 20 years.

For an interest rate of 0%, FV returns payment-number*term-number. For a positive interest rate, FV(payment, rate, term) is equivalent to:

$$\frac{payment * (1.0 + rate)^{term}}{rate}$$

Examples

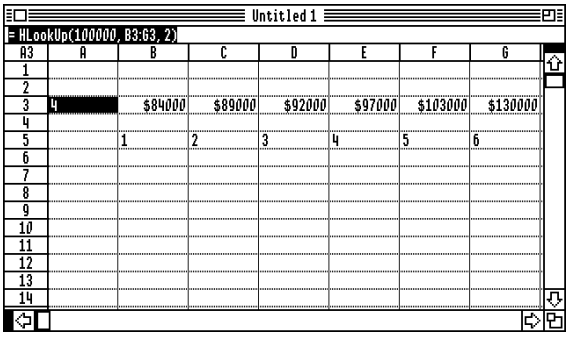
Expression	Returns
FV($1000, 8%, 20)	$45761.96

HLOOKUP (value-number , number-list , offset-number)

Returns a value from another cell.

HLOOKUP is used to read a value from a horizontal table of numbers. *Number-list* is a cell range, such as C3:G4. Unlike the number lists in other spreadsheet functions, this parameter really does have to be a range of cells, and only one range is allowed. The top row of the cell range is scanned, left to right. HLOOKUP finds the largest value in the list of cells that is less than or equal to *value-number*. It then looks *offset-number* columns below the value it found, and returns the value of that cell.

For example, consider this table of home prices.



The goal is to quickly find the number of homes under $100,000. The expression

HLookup(100000, B3:G3, 2)

does the job. Here's how it works: First, HLOOKUP scans the cells from B3 to G3, examining each value. When HLOOKUP examines cell F3, it finds a value over 100000, so it stops the scan and backs up to the previous cell, E3. *Offset-number* is 2, so HLOOKUP looks down two cells to cell E5, returning the value 4 from that cell.

△ **Important** HLOOKUP scans the values in the cell range one at a time, stopping as soon as a value is found that is larger than *value-number*. The scan stops even if there is another number later in the table that is smaller than *value-number*. For that reason, any table you expect to search with HLOOKUP must be sorted from smallest to largest value to get accurate results. △

If the first value in the table is larger than *value-number*, HLOOKUP returns *Error*.

See VLOOKUP for a similar function that examines tables organized as columns, rather than rows.

Examples

Expression	Returns
HLookup(90000, B3:G3, 2)	1 (Assuming the table shown above is used.)

IF (condition-number , true-number , false-number)

IF evaluates *condition-number*, which is generally some logical condition like A3<4.5. If the result is not zero (TRUE), the expression *true-number* is evaluated, and IF returns that value. If the result is 0 (FALSE), *false-number* is evaluated, and IF returns that value.

There are several interesting things about the IF statement that aren't obvious right away.

- *Condition-number* is usually a logical expression, but it does not have to be. Zero is always treated like FALSE, and any other number like TRUE.
- *True-number* and *False-number* can return numbers or strings. IF returns whatever value the expression does, so it's possible for the result of IF to be either a string or a number.
- Only one of the expressions is evaluated. For example, the expression

  If (A3=0, Alert('Zero'), Alert('Not zero'))

  will only display one of the alerts.

Examples

Expression	Returns
If (0, 4, 5)	5
If (TRUE, 'Red', 'Blue')	'Red'

INF

Returns infinity.

While infinity isn't exactly a number in mathematics, it is a useful idea, and works fine in equations. Adding any number to infinity, or subtracting any number from infinity, returns infinity. Multiplying any number except zero by infinity also returns infinity; it is an error to multiple zero by infinity. Dividing infinity by any number gives infinity, while dividing a number by infinity gives zero. Dividing infinity by itself is an error.

Examples

Expression	Returns
Inf	inf
1/0	inf

INT (number)

Returns the whole part of a number.

Note INT converts a real number to an integer by removing any fraction part. To get the *closest* integer to a real number, use ROUND.

Examples

Expression	Returns
Int(1.63)	1
Int(-3.14)	-3
Int(1.23e4)	12300

IRR (expression , number-list)

Calculates the internal rate of return for a series of cash flows.

IRR uses an iterative technique to find the internal rate of return from a series of cash flows. It returns the interest rate that would cause the net present value to be zero. *Expression* is your

estimate of the interest rate, while *number-list* is a list of the cash flows; they do not need to be equal. In general, you should choose a value between 0 and 1 for the interest rate.

For example, assume you have purchased collectable stamps costing $500. The following three years you sell some stamps, earning $100, $150 and $200. The next year you buy $300 worth of stamps. The year following, you sell $250 worth of stamps, and the next year you sell your entire collection for $500. Would you have been better off putting your money in a 10% bond?

To find out, compute the internal rate of return like this:

=IRR(10%, -500, 100, 150, 200, -300, 250, 500)

This gives 15.05%, so your stamp collection did better than the bond would have.

ISBLANK (string)

Returns TRUE (a numeric value of 1) if the expression is a null string, and FALSE (a numeric value of 0) if it is not a null string.

A null string is a string with no characters. If the string has any characters—even a space—it is not a null string.

Blank cells are treated as null strings. Label cells, cells that return a numeric value, and expressions that return a numeric value are treated as a string that is not null.

Examples

Expression	Returns
IsBlank(“”)	1
IsBlank(“3”)	0
IsBlank(Position(“x”, “abc”))	0

ISEMPTY (expression)

Returns TRUE (a numeric value of 1) if the cell is empty, and FALSE (a numeric value of 0) if it is not empty.

A cell is empty if is has no label or expression. Any label or expression, even a label consisting of a space or an expression returning a null string, is treated as a cell that is not empty.

While IsEmpty will accept a parameter that is not a cell name, it’s generally not useful. The result is always TRUE.

Examples

Expression	Returns
IsEmpty(0)	1
IsEmpty(G4)	1 if G4 contains something, 0 if not.

ISERROR (expression)

Returns TRUE (a numeric value of 1) if *expression* evaluates to *Error*, and FALSE (a numeric value of 0) if it evaluates to anything else.

When an error of some sort occurs, such as extracting the square root of a negative number, the result is a special number that prints as *Error*. ISERROR can detect this number, returning TRUE if the result is an error. For example, if you know a cell is prone to errors from improper data entry, you can use ISERROR to test for an error condition and display an alert.

Examples

Expression	Returns
If(IsError(G7), Alert("Not!"), 0)	Displays alert if G7 is *Error*

ISNA (expression)

Returns TRUE (a numeric value of 1) if *expression* evaluates to N/A, and FALSE (a numeric value of 0) if it evaluates to anything else.

N/A is a special number you create using the function NA. Use ISNA to test cells for this special number.

Examples

Expression	Returns
If(IsNA(G7), Alert("Check this!"), 0)	Displays alert if G7 is N/A.

ISNUMBER (expression)

Returns TRUE (a numeric value of 1) if *expression* is a number, and FALSE (a numeric value of 0) if it is anything else.

Numbers include expressions that return a number, cells that contain an expression that returns a number, and numeric constants. Keep in mind that boolean values like TRUE and FALSE, dates, and grades are all numbers, even if they are displayed some other way. Blank cells, cells containing a label, string constants, and expressions that return a string are not numbers.

Examples

Expression	Returns
If(Not IsNumber(G7), Alert("G7 should contain a dollar amount."), 0)	Displays alert if G7 is not a number.

ISSTRING (expression)

Returns TRUE (a numeric value of 1) if *expression* is a string, and FALSE (a numeric value of 0) if it is anything else.

Strings include cells that contain a label, string constants, and expressions that evaluate to a string. Strings do not include blank cells or any numeric value. Keep in mind that, while dates and grades are displayed as a string, they are really numbers displayed in a special way.

Examples

Expression	Returns
If(Not IsString(G7), Alert("G7 should be a person's name."), 0)	Displays alert if G7 is not a string.

LEN (string)

Returns the number of characters in a string.

Examples

Expression	Returns
Len("Hello, there")	12

LN (number)

Returns the natural logarithm of a number.

☆ **Tip** To get a base 10 logarithm, use the LOG function. For any other base, you can get the logarithm using the formula LN(x)/LN(b), where b is the base. For example, LN(x)/LN(10) equals LOG(x). ☆

Examples

Expression	Returns
Ln(2.71828183)	1
Ln(1024)/Ln(2)	10

LOG (number)

Returns the base 10 logarithm of a number.

Examples

Expression	Returns
Log(1000)	3
1+Int(Log(1234))	4

LOWER (string)

Converts all of the characters in a string to lowercase characters. Only uppercase alphabetic characters are affected.

See also UPPER, PROPER.

Examples

Expression	Returns
Lower("Hello There")	"hello there"

MAX (number-list)

Returns the largest value from a list of numbers.

Blank cells, label cells, and cells that evaluate to a string are ignored by MAX.

Examples

Expression	Returns
Max(4, 0, -3.5)	4

MIN (number-list)

Returns the smallest value from a list of numbers.
Blank cells, label cells, and cells that evaluate to a string are ignored by MIN.

Examples

Expression	Returns
Min(4, 0, -3.5)	-3.5

MOD (numerator-number , denominator-number)

Returns the remainder from a division.
Numerator-number is divided by *denominator-number*. Instead of returning the result of the division, though, MOD returns the remainder from the division.
While MOD is generally used with whole numbers, it is defined, and works fine, with fractional values, too. MOD(a, b) is completely equivalent to

a - (Int(a / b)*b)

Examples

Expression	Returns
Mod(10, 4)	2
Mod(-7, 2)	-1
Mod(-7, -2)	-1
Mod(7, -2)	1
Mod(3.3, 1.5)	0.3

MONTH (string)

Returns the month string for a date.
The date is given as a string, and follows the same rules as string date constants. (See "Date Constants," earlier in this chapter.)
See also DATE, DAY, NUMDATE, TODAY, WEEKDAY and YEAR.

Examples

Expression	Returns
Month("5/4/94")	"May"
Month("July 4, 1776")	"July"

NA

Returns the value N/A.

☆ **Tip** Use NA when the value of a cell would not make sense. For example, in a spreadsheet that calculates the average of several cells, the average doesn't exist if none of the cells have values, yet. In that case, you can use the formula IF(COUNT(B3:B10) = 0, NA, AVG(B3:B10)). This formula prints N/A if there are no values in the range of cells, and the average if there is at least one value. ☆

Examples

Expression	Returns
NA	N/A

NOT (number)

NOT returns 1 (TRUE) if the number is zero, and 0 (FALSE) if the number is anything except zero.

Examples

Expression	Returns
Not(FALSE)	0 (TRUE)
Not(4)	0 (FALSE)

NPV (rate-number , number-list)

Computes the net present value of a series of uneven cash flows.

NPV is used to decide if an investment is a good idea. *Rate-number* is the interest rate that could be earned if money is not invested at all. It might also be the interest that will be paid on money borrowed to carry out a project. *Number-list* is a list of the cash flows, with investments listed as negative numbers, and returns listed as positive numbers. If the net present value is positive, the investment is profitable; otherwise, it is not profitable.

Examples

Expression	Returns
NPV(10%, -100, 50, 50, 30)	8.47

NUMDATE (string)

Returns the numeric equivalent of a date string.

The date is given as a string, and follows the same rules as string date constants. (See "Date Constants," earlier in this chapter.)

See also DATE, DAY, MONTH, NUMDATE, WEEKDAY and YEAR.

☆ **Tip** Use NUMDATE to convert a date string into a number, then perform math on the number. Use DATE to convert the number back into a string for display.

For simple calculations, or for forming a series of dates as labels, it's generally easier to use Cell Attributes... from the Tools menu and perform math directly on a date constant. ☆

Examples

Expression	Returns
NumDate("1 June 94")	728445
NumDate("25 Dec 94")-NumDate("4 Jul 94")	174

NULL

Returns the null string. The null string is a string with no characters.

Examples

Expression	Returns
Length(Null)	0

OR (number-list)

Returns TRUE if any one of the numbers in the list is true, and FALSE if all of the numbers are not true.

In most cases, you'll use OR on cells or expressions whose value is created with another logical function or a comparison operator, like OR(A3>0, A3<10). OR happens to work fine on numbers, though. Zero is treated as FALSE, and any other number works like TRUE.

Examples

Expression	Returns
Or(TRUE, FALSE)	1 (TRUE)
Or(FALSE, TRUE)	1 (TRUE)
Or(FALSE, FALSE)	0 (FALSE)
Or(TRUE, TRUE)	1 (TRUE)
Or(TRUE, 0, -5)	1 (TRUE)

PI

Returns the value π.

☆ **Tip** π is frequently used in trigonometry, but it's also used in formulas involving circles and spheres. Here's a few handy formulas. In all cases, r is the radius of the circle or sphere. The radius is half of the diameter; it's also the distance from the center of a circle or sphere to the edge.

circumference of a circle	$2\pi r$
area of a circle	πr^2
volume of a sphere	$4\pi r^3/3$ ☆

Examples

Expression	Returns
π/2	1.570796

PMT (PV-number , rate-number , term-number)

Returns the periodic payment needed to amortize a loan.

PMT calculates the size of a payment needed to pay off a loan of *PV-number* in *term-number* payments. *Rate-number* is the interest rate per period.

△ **Important** Keep in mind that *rate-number* is the interest rate per period, not the annual interest rate. If payments are made each month, divide the annual interest rate by 12. △

For example, if you buy a $96,000 home at an annual interest rate of 9.5%, and intent to make monthly payments for 30 years, the payment is

PMT($96000, 9.5%/12, 30*12)

For an interest rate of 0%, PMT returns *PV-number*/*term-number*. For a positive interest rate, Payment(pv, rate, term) is equivalent to

$$pv * rate * \frac{(1.0 + rate)^{term}}{(1.0 + rate)^{term} - 1.0}$$

Examples

Expression	Returns
PMT($96000, 9.5%/12, 30*12)	$807.22

POSITION (search-string , string)

Searches the string for the first occurrence of *search-string*, returning the position.

The position is the location in *string* of the first character in the matching substring. Characters are numbered from 1. If *search-string* is not found, POSITION returns 0.

Note The search is case sensitive, so "WHO" will not be found in the string "Who did it?" If you want a case insensitive search, use UPPER or LOWER to convert both strings to all uppercase letters or all lowercase letters.

Examples

Expression	Returns
Position("ow", "wow")	2
Position("w", "Wow")	3
Position("w", Lower("Wow"))	1
Position("test", "This is a...")	0
Position("Marcus", "Marc")	0
Position("Marc", "Marcus")	1

PRODUCT (number-list)

Returns the product of a list of numbers.

Blank cells, label cells, and cells that evaluate to a string are ignored by PRODUCT.

Examples

Expression	Returns
Product(1, 2, 3, 4)	24

PROPER (string)

Converts all of the characters in a string except the first to lowercase characters. The first character in the string is converted to uppercase. Only alphabetic characters are affected.

See also LOWER, UPPER.

☆ **Tip** PROPER works well for capitalizing sentences created with CONCAT and for displaying names from imported uppercase databases. ☆

Examples

Expression	Returns
Proper("GEORGE")	"George"

PV (payment-number , rate-number , term-number)

Returns the present value of a series of periodic investments.

PV calculates the present value when the total number of payments, the amount of the payments, and the interest rate are known.

For example, Joe's Lotteries is paying off a $1,000,000 lottery winner. As lottery companies tend to do, the $1,000,000 is actually paid off as twenty $50,000 payments. Joe will deposit some amount in a trust fund so it will earn an annual interest of 7%, and the first withdrawal will be made after the first year. Then

PV($50000, 7%, 20)

returns the amount of money Joe's Lotteries must deposit in the trust fund.

For an interest rate of 0%, PV returns *payment-number*term-number*. For a positive interest rate, PV(payment, rate, term) is equivalent to

$$payment * \left(1.0 - \frac{1.0}{(1.0+rate)^{term}} \right) / rate$$

Examples

Expression	Returns
PV($50000, 7%, 20)	$529700.71

RAD (number)

Converts a number from degrees to radians.

☆ **Tip** Computers like to deal with numbers in radians, but most people think about angles in terms of degrees. Use RAD to convert the degrees you are familiar with into the radians the computer expects. ☆

Examples

Expression	Returns
Cos(Rad(45))	0.70711

RANDOM (number)

Returns a pseudo-random number that is less than the argument and greater than or equal to 0.0.

Note A new random number is generated when you change the expression containing the RANDOM function, when the spreadsheet is loaded from disk, and when you select Calculate Now from the Options menu.

Examples

Expression	Returns
Random(10)	Any value from 0.0 to 9.999

RATE (PV-number , rate-number , term-number)

Returns the effective interest rate for a given present value, future value, and number of periods.

For example, Sally is buying a savings bond that will mature in 6 years, paying $2500. The asking price for the bond is $1800. Then the effective interest rate is

Rate($2500, $1800, 6)

Rate(pv, fv, term) is equivalent to:

$$e^{\ln(fv/pv)/term} - 1.0$$

Examples

Expression	Returns
Rate($2500, $1800, 6)	5.63%

ROUND (value , digits)

Returns the number closest to value that has no more than *digits* digits to the right of the decimal place. Use 0 for *digits* to round to a whole number.

Examples

Expression	Returns
Round(3.6, 0)	4
Round(-4.9, 0)	-5
Round(3.667, 2)	3.67

SGN (number)

Returns -1, 0 or 1, depending on the sign of the argument.

Examples

Expression	Returns
Sgn(-7.5)	-1
Sgn(0)	0
Sgn(3.14)	1

SIN (number)

Returns the sine of the number.

The number must be an angle expressed in radians. If the absolute value of the angle is very large, the answer will not be accurate.

☆ **Tip** Use the RAD function to convert an angle from degrees to radians. ☆

Examples

Expression	Returns
Sin(Rad(45))	0.70711

SQRT (number)

Returns the square root of a number.

Examples

Expression	Returns
Sqrt(2)	1.41421

STDV (number-list)

Returns the sample standard deviation of a list of numbers.

Blank cells, label cells, and cells that evaluate to a string are ignored by STDV.

There are two common ways to evaluate the standard deviation. One way assumes that the list of numbers represents an entire population, while the other assumes that the list of numbers is a sample from a larger population. STDV uses the second method. The mathematical formula used is:

$$STDV = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$$

See also VAR.

Examples

Expression	Returns
STDV(1, 3, 4, 10)	3.87298

STRING (number)

Converts a number to a string.

STRING uses the same rules for converting a value to a string as the spreadsheet's General format option.

See also VAL.

Examples

Expression	Returns
String(45.0)	"45"

String(3.14159)	"3.14159"
String(1E2)	"100"
String(40000*40000)	"1.6000E9"

SUBSTR (string , start-number , length-number)

Returns a substring.

Start-number is the number of the first character to return, counting from 1. *Length-number* is the number of characters to return. If *start-number* is past the end of the string, SUBSTR returns the null string (a string with no characters). If the selected characters extend past the length of the string, all of the selected characters from the string are returned, but no extra characters are added.

Examples

Expression	Returns
SubStr("Howdy", 1, 3)	"How"
SubStr("Too short", 20, 10)	""
SubStr("Also short", 6, 255)	"short"

SUM (number-list)

Returns the sum of a list of numbers.

Blank cells, label cells, and cells that evaluate to a string are ignored by SUM.

Examples

Expression	Returns
Sum(1, 2, 3, 4)	10

TAN (number)

Returns the trigonometric tangent of the number.

The number must be an angle expressed in radians. If the absolute value of the angle is very large, the answer will not be accurate.

☆ **Tip** Use the RAD function to convert an angle from degrees to radians. ☆

Examples

Expression	Returns
Tan(Rad(45))	1.0

TERM (payment-number , rate-number , fv-number)

Returns the number of periods required to achieve an investment goal.

TERM calculates the number of periods needed to reach an investment goal. *Payment-number* is the amount to be invested in each interest period. *Rate-number* is the interest rate. *FV-number* is the investment goal.

For example, Frank is being offered a whole life insurance policy that will mature in 30 years and pay $100,000. The policy will cost Frank $3000 per year. Frank needs to decide if the whole life insurance policy is a better investment than his 5% passbook savings account. The formula

Term($3000, 5%, $100000)

returns 20.1, telling Frank that if the same money is placed in a passbook savings account, he will have $100,000 in a little over 20 years.

TODAY

Returns a date string representing the current date.

The format for the date string is the same as the long date format in the Cell Attributes... command. An example is “October 31, 1995”.

The date is taken from the internal Apple IIGS clock. If the clock is wrong, the date will also be wrong. You can set the date using the control panel.

See also DATE, DAY, MONTH, NUMDATE, WEEKDAY and YEAR.

Note The date is updated when you change the expression containing the TODAY function, when the spreadsheet is loaded from disk, and when you select Calculate Now from the Options menu.

Examples

Expression	Returns
Today	June 1, 1994
Date(NumDate(Today)+7)	June 8, 1994

TRUE

TRUE is a constant that returns the numeric value 1. TRUE is generally used in logical expressions, like the operand for an IF or AND function, but it's perfectly legal to use it in mathematical expressions, too. For example, if you have a series of cells that are either TRUE or FALSE, you could count the number of true cells by adding all of the TRUE and FALSE values together.

The various functions that expect a logical operand, like TRUE or FALSE, treat 0 as FALSE and any other value as TRUE.

Examples

Expression	Returns
TRUE	1
TRUE+FALSE+TRUE	2

UPPER (string)

Converts all of the characters in a string to uppercase characters. Only alphabetic characters are affected.

See also LOWER, PROPER.

Examples

Expression	Returns
Upper("i.e.")	"I.E."

VAL (string)

Converts a string to a number.

VAL accepts all of the numeric forms that work in a cell, but not the special text constants, like dates or grades.

See also STRING.

Examples

Expression	Returns
Val(Concat("4", "5"))	45

VAR (number-list)

Returns the sample variance of a list of numbers.

Blank cells, label cells, and cells that evaluate to a string are ignored by VAR.

There are two common ways to evaluate the variance. One way assumes that the list of numbers represents an entire population, while the other assumes that the list of numbers is a sample from a larger population. VAR uses the second method. The mathematical formula used is:

$$VAR = \frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}$$

The variance is the square of the standard deviation. Use STDV for the standard deviation.

Examples

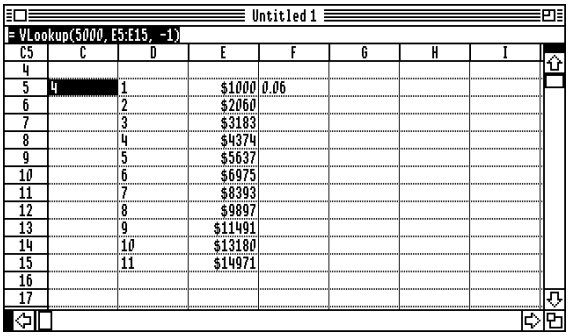
Expression	Returns
VAR(1, 3, 4, 10)	15

VLOOKUP (value-number , number-list , offset-number)

Returns a value from another cell.

VLOOKUP is used to read a value from a vertical table of numbers. *Number-list* is a cell range, such as C3:C15. Unlike the number lists in other spreadsheet functions, this parameter really does have to be a range of cells, and only one range is allowed. The left column of the cell range is scanned, top to bottom. VLOOKUP finds the largest value in the list of cells that is less than or equal to *value-number*. It then looks *offset-number* rows to the right the value it found, and returns the value of that cell.

For example, consider this table showing the growth of a savings account at 6% interest with $1000 deposit each year.



The expression

VLookup(5000, E5:E15, -1)

returns the number of years until the account exceeds $5000. Here's how it works: First, VLOOKUP scans the cells from E5 to E15, examining each value. When VLOOKUP examines cell E9, it finds a value over 5000, so it stops the scan and backs up to the previous cell, E8. *Offset-number* is -1, so VLOOKUP looks one cell to the left, returning the value 4 from cell D8.

△ **Important** VLOOKUP really does scan the values in the cell range one at a time, stopping as soon as a value is found that is larger than *value-number*. The scan stops even if there is another number later in the table that is smaller than *value-number*. For that reason, any table you expect to search with VLOOKUP must be sorted from smallest to largest value to get accurate results. △

If the first value in the table is larger than *value-number*, VLOOKUP returns *Error*.

See HLOOKUP for a similar function that examines tables organized as rows rather than columns.

Examples

Expression	Returns
VLookup(7500, E5:E15, -1)	6 (Assuming the table shown above is used.)

WEEKDAY (string)

Returns the day of the week for a date string.

The date is given as a string, and follows the same rules as string date constants. (See "Date Constants," earlier in this chapter.)

The weekday is returned as a string.
See also DATE, DAY, MONTH, NUMDATE, TODAY and YEAR.

Examples

Expression	Returns
Weekday("6/4/94")	Saturday
Weekday("July 4, 1776")	Thursday

YEAR (string)

Returns the year for a given date string.
The date is given as a string, and follows the same rules as string date constants. (See "Date Constants," earlier in this chapter.)
See also DATE, DAY, MONTH, NUMDATE, TODAY and WEEKDAY.

Examples

Expression	Returns
Year("5/4/94")	1994
Year("July 4, 1776")	1776