

College Mathematics

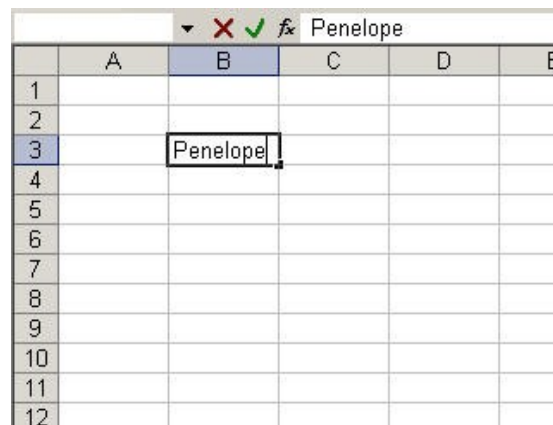
introduction to spreadsheets

A spreadsheet is a computer program that allows you to perform calculations in a visually organized way.

One commonly available spreadsheet is Microsoft Excel, which is part of Microsoft Office. Other software, including IBM Lotus 1-2-3, AppleWorks, and Microsoft Works, also have spreadsheet tools.

When you first start the program, you essentially see a blank sheet of paper divided into many boxes. This is called a worksheet and is meant to look like a ledger sheet used by accountants. Notice that the rows and columns have labels. Each column is labeled by a letter (A, B, C,...), and each row is labeled by a number (1, 2, 3,...).

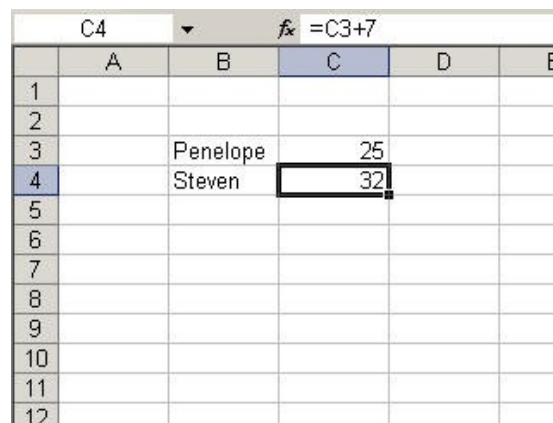
Using these labels, you can refer to any box. For example, notice that box A1 is highlighted. Now, use the arrow keys or the mouse to select B3. Type the name "Penelope". The screen should look like this:



	A	B	C	D	E
1					
2					
3		Penelope			
4					
5					
6					
7					
8					
9					
10					
11					
12					

Each box may contain text, a number, or a formula. Text and numbers stay the same unless you type over them. A formula can change its value based on the value of other boxes. A formula always starts with an equals sign.

Example 1 (basics): Suppose Penelope has a boyfriend, Steven, who is exactly 7 years older. Let's build a tiny worksheet to help her calculate Steven's age at different times in her life. In B4, type "Steven". In C3, type "25", which is Penelope's age. In C4, type " $= C3 + 7$ ", which is a formula that calculates Steven's age based on Penelope's. (Just type what's between the quotes.)

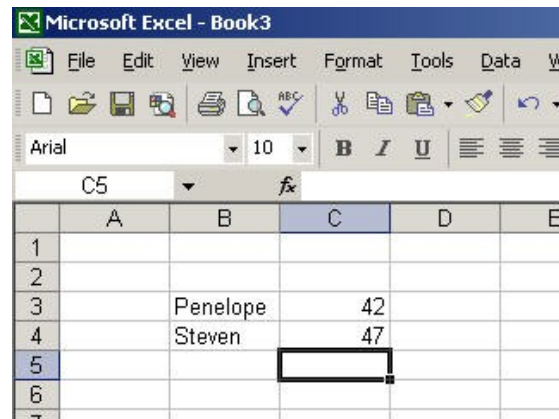
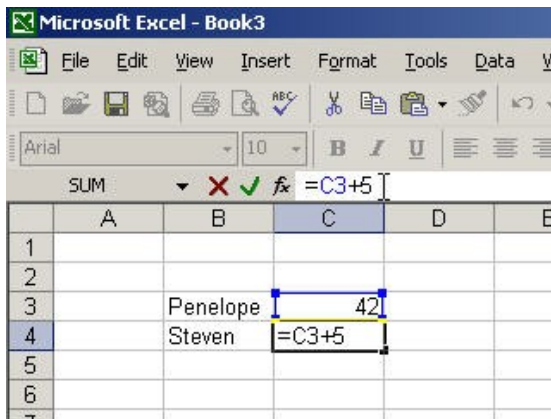


	A	B	C	D	E
1					
2					
3		Penelope	25		
4		Steven	$=C3+7$		
5					
6					
7					
8					
9					
10					
11					
12					

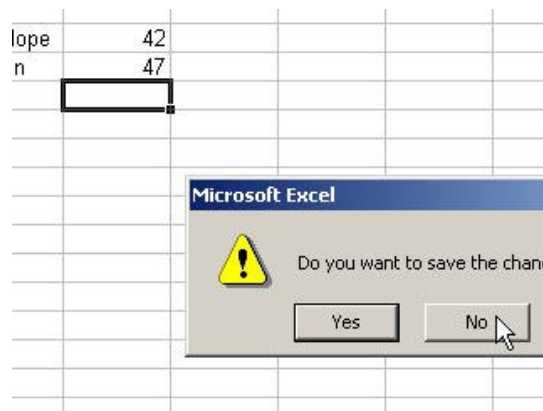
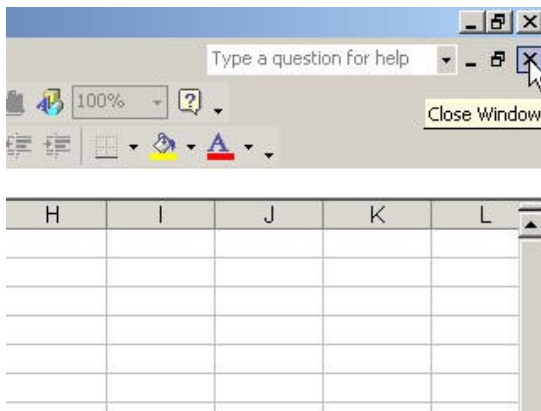
Notice that if you change Penelope's age (in C3) to 42, when you press the Enter key, Steven's age (in C4) is automatically *updated*:

	A	B	C	D	E
1					
2					
3		Penelope	42		
4		Steven	49		
5					
6					
7					
8					
9					
10					
11					
12					

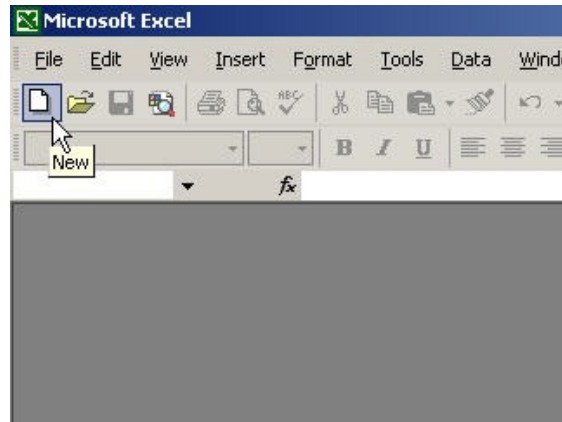
Suppose it turned out that Steven was only 5 years older than Penelope. To edit the contents of a box (without re-typing everything), click on the formula bar. Then you can use the mouse, the arrow keys, and delete keys to edit the line. We'll change the formula in C4, and then press the Enter key to *update*:



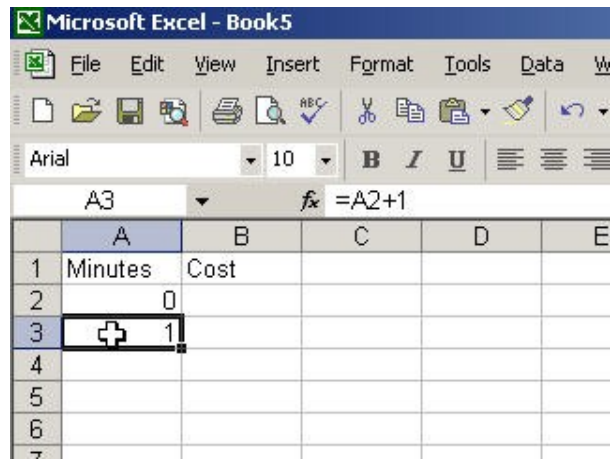
That's about it for this first example. Click on the lower cross in the upper-right corner of the window. Unless you really want to save the worksheet we just created, click "No":



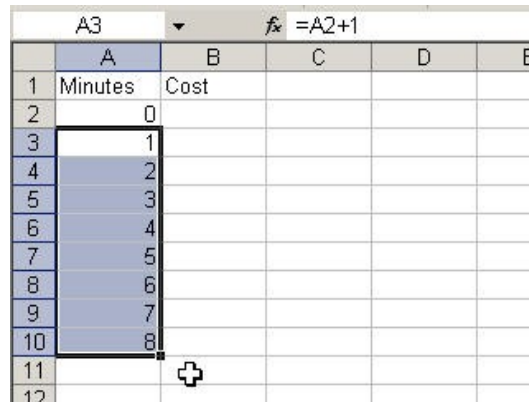
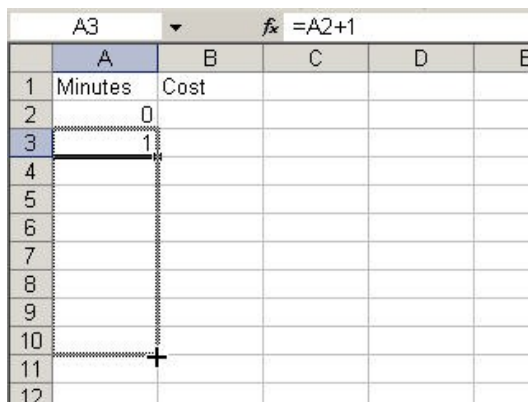
Example 2 (fill down): Suppose the cost of a phone call is 30 cents plus 7 cents for each minute that you talk. Let's make a table to show how much we would spend on calls of various lengths. First, click on the "new worksheet" button:



Start by making column headings: Type "Minutes" in A1 and "Cost" in B1. Then, get the minutes column started: type 0 in A2, and "=A2+1" in A3:



Now, we'll learn a powerful shortcut to generate formulas for simple patterns. Make sure A3 is highlighted. Carefully place the mouse cursor over the black square dot at the bottom right corner of the box until the cursor becomes a black cross. Then, hold down the left mouse button while you drag the cursor down to A10. When you let go of the mouse button, you should see that the formula has been copied all the way down. Notice, though, that the formula has been changed so that it still has the same meaning *relative* to the box it's in. In each case, the formula still *adds 1* to the *value above*.



Now that we've filled in the minutes, let's fill in the costs. Start by typing 0.30 in B2 and "=B2+0.07" in B3. Then, fill down by dragging the black square dot down to B10:

	A	B	C	D	E
1	Minutes	Cost			
2	0	0.3			
3	1	0.37			
4	2				
5	3				
6	4				
7	5				
8	6				
9	7				
10	8				

There are many little things you can do to change or improve the appearance of the data. For instance, we might want the costs to look like this: \$0.37

	A	B	C	D	E
1	Minutes	Cost			
2	0	0.3			
3	1	0.37			
4	2	0.44			
5	3	0.51			
6	4	0.58			
7	5	0.65			
8	6	0.72			
9	7	0.79			
10	8	0.86			

You can also choose from many other formats, fonts, alignments, and other helpful or pretty features.

With these simple tools, we can build worksheets that help us do quite complicated calculations, such as those involved in annuities and loan payment schedules.