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# **Excel - Basic operations**

# Introduction

Excel is a spreadsheet. Its role is the creation and the analysis of decision-making models. Every document, or file, consists of several worksheets containing 256 columns (named A to IV) and of 65536 lines filled with cells in witch you can enter either text, numbers or formulas. Every cell of the document has a unique address. It's determined by the place where it's located in the spreadsheet. For example, the very first cell in the upper left corner of every first sheet meets itself in the column A on the first line. So the address that consists by its position with regard to columns and in lines is called **A1**. It's at the junction of column A and line 1. The cell address just to its right is **B1** and so on. Also, every cell can contain up to 65 000 characters.

These cells are all on the first worksheet named **Sheet1**. You can have up to 100 worksheet in a single spreadsheet file. That will allow you to make "in depth" calculations. That's more than enough room to create your own models. But sometimes, it's useful to get some numbers that are in other spreadsheet files. Excel can help you link to those files too.

# Moving inside the spreadsheet

Cursors	To move to a cell towards the left, right, up or down.				
Enter	To accept the text, the number or the formula that was entered in the cell.				
Tab	Moves the cursor a cell to the cell on the right of the active cell.				
Shift + Tab	Moves the cursor a cell to the left of the active cell.				
End + cursor Or Ctrl + cursor	To move at the end of a series of filled cells, with some content, or a series of empty cells.				
PageUp and PageDn	To move a screen up or down.				
Alt + PageUp and Alt + PageDn	To move of one screen to the left or to the right.				
Ctrl + PageUp and Ctrl + PageDn	To move to the previous or following worksheet.				
Ctrl + Home	To return to the upper left corner of the current worksheet.				
Ctrl + End	To move in the last cell containing text, a number or a formula.				
F5 or Ctrl + T	To move directly to any cell of the file.				
Blocks					

There are several ways to move inside an Excel spreadsheet. You can always click on the worksheet and on the cell that you need. Here is the list of keys that you can use to move.

There will be times when you will want to select several cells at one time so to be able to change the presentation or to create charts or to take advantage of the other possibilities in Excel. The software offers you at least three ways to select a range of cells.

But before starting, it's necessary to pay attention to the format of the cursor. The cursor changes format according to the place where it's located on the worksheet on even inside a cell. To select cells, the cursor must have the format of a big white "+" like this  $\Box$ . You can't make a block when the pointer is in the format of an arrow  $\bigtriangledown$ . However, you can move a range of cells using that format. Place the pointer on the border of the cell or of a range of cells. Press and hold the **left** mouse button and move it to it's new location. You can also copy the content of a cell if you place the pointer on the dot at the button right corner of the active cell. The pointer changes to the format of a thin black "+". Using this format, you can copy the contents of the cell or the range of cells vertically or horizontally. So, before selecting a range of cells, always make sure that the cursor is in this format  $\Box$ .

### 1-Use the mouse.

To select a range of cells by using the mouse.

Place the cursor over the first cell of your block.
Press and hold the left mouse button, move the cursor up to the last cell of your block.
Release the mouse button.

This is practical when the range of cells is relatively small. But what to do when you need to make a range of cells that's bigger than a screen? It's in this situation that using the mouse with the Shift key is more practical.

### 2-Use the Shift key.

Place the cursor over the first cell of your block.

Press the left mouse button.

Move the cursor over the last cell of your block.

Press and hold the Shift key and click the last cell of the block.

By doing a block this way, you don't have to keep a finger on the mouse button. It avoids overshooting the width of the block that you wanted that would force you to go back and fourth until you select the right size.

There is a last method that you should know. Both first possibilities offer you the possibility to make a continuous block. All the cells between both extremities of the block will be selected. But what can you do when the necessary cells are not the one next to another ? The last method demonstrates how you can make many blocks of cells that are located everywhere in the worksheet.

### 3-Use the Ctrl key.

Make your first range of cells by using the mouse or with the Shift key.
Press and hold the Ctrl key and make your second range of cells.
If you need the other blocks of cells, keep your finger on the Ctrl key and use the mouse to make as many blocks as you need.

This last technique is very advantageous when you have blocks of cells that are distant from one to another. You can use it for example to select blocks that will

be the source for a chart. But, it that last case, every block must represent at least a series of data for the chart, not just a lonely cell.

### Data entry

There are three types of data that you can enter into a cell : text, numbers and formulas. The other objects, such as charts, drawings and maps, "float" over cells They don't affect the cells under it. To demonstrate the many way of entering your data, follow the following exercise:

Open Excel with a new worksheet.
Click on the A1 cell.
Enter 1 and press the Enter key.

The active cell moved to the **A2** cell that's directly below **A1**.

•Enter the text following **"To the right"** and press the Tab key or **Tabulation** key (next to the the Q key to the left of on the first row of keys).

The active cell moved to the right of the last cell which is **B2**. The combination of the **Shift** and **Tab** keys would move the active cell back to the left.

•Enter the formula **=A1+5** and press the down cursor on your keyboard.

You can also enter data and use the cursors to quickly pass to another cell and enter more data. The active cell should be the **B3** cell.

### **X √** = 4

Place the cursor on the formula bar.

•Enter 4 and press the  $\checkmark$  button or press the **Enter** key.

As just you discovered, it's possible to enter the contents of a cell by using the Enter, Tab and cursors keys and the formula bar.

### Formulas

One of the biggest advantages of a spreadsheet is the automation of the calculations. By entering a formula instead of a number, it's easier to change the model and get the wanted results faster. Formulas should be used in every time it's possible. You use a spreadsheet to analyze and interpret the results. Leave the task of crunching the numbers to the spreadsheet.

Every formulas begins with the +, - or = sign. An Excel functions always begin with a =.

Ex: =a1+a2, =sum(a1:z20), =average(a1:z20), =vlookup(a1,B1:c20,2)

A mistake that's often committed by beginners using an Excel functions is to place a space between the name of the function and the first bracket. Ex: =sum () instead of =sum(). The name of the function and it's first bracket must be glued together: no spaces. Also, some functions need more than one parameter or information to work properly such as the =vlookup function above. A comma is used to separate these parameters.

To see the list of all the Excel functions, depending on the version of Excel that you have.

Press the down arrow beside the AutoSum button 
 Select the More Functions option.
 OR
 From the Insert menu, select the Function option.

It's possible to make a formula that uses the contents of cells that are in a different worksheet or even a different file! To do this, you must specify the name of the worksheet with the cell address. An exclamation point (!) is used to separate the name of the worksheet from the cell address.

```
Ex: =a1+sheet2!A1 , =sum(sheet1!A1:sheet3!A1)
```

To really take advantage of a spreadsheet, you must be able to use numbers coming from other worksheets and even from other files. The next part consists in explaining how to reach the contents of cells in other worksheets and then from other spreadsheets. If the file does not contain at least three worksheets, you can add them by using from the **Insert** menu the **Worksheet** option.

### Numbers from another worksheet

From the first worksheet, enter 100 in the A1 cell.
Click on the tab of the second worksheet.
OR
Press the Ctrl and the PgDn (Page Down) keys.

In this worksheet, enter **200** in the **A1** cell.

And now for the formula. It consists in adding the contents of the **A1** cells from the first two worksheets of the file into the third worksheet.

Click on the tab of the third worksheet.In the A1 cell, enter the = sign.

This is the start of the formula. It's now necessary to select the needed cells in the formula.

```
Click on the tab of the first worksheet (Sheet1).
From the first worksheet, Click on the A1 cell.
Press the key +.
Click on the tab of the second worksheet (Sheet2).
On this worksheet, Click on the A1 cell.
Press the Enter key.
OR
In the A1 cell of the third worksheet, enter the following formula: =sheet1!
A1+sheet2! A1.
```

The formula is complete. The result should be 300. In fact, to reach any cell of the file that's not on the present worksheet, you must first write the name of the worksheet followed by the exclamation mark and the then address of the cell. Ex: **=Sheet1! A1**. There is another way of arriving at the same result.

From the third worksheet, place the cursor in the A2 cell.
In the A2 cell, enter the beginning of the formula =sum(
Click on the tab of the first worksheet (Sheet1).
Click on the A1 cell.
Press and hold the Shift key, click the tab of the second worksheet.
To end the formula, close the bracket ) and press the Enter key.
OR
Enter the following formula: =sum(sheet1:sheet2! A1).

•To see if the formula works, change the value of the **A1** cell of the first worksheet from 100 to 300.

The new result of the A1 and A2 cells of the third worksheet should be 500.

All the functions can be also accomplished in "3D". That is by using the content of cells of other worksheets of the file.

### Numbers from another worksheet

Imagine the possibilities if you could also use numbers coming from the other files! It's possible. This exercise demonstrates how to do it.

Open a new file.
Enter 100 the A1 cell.
Save the file under the name test1.xls.
Do not close the file.

The content of the first file is completed. The second file will come to look for this number in a few moments. It's easier to carry out this operation when both files are opened. Excel can open up to 99 files at the same time. To pass from a file to another, go to the Window menu and to choose the required file.

From the File menu, select the New option.
From the Task pane, select the Blank workbook option.
Press the OK button.
OR
From the standard toolbar, press the button.

From the standard toolbar, press the <u>button</u>.
Place the cursor in the **A1**cell.
Press the key =.

From the Window menu, select the Test1 file.
OR
Ear those using Excel 2000 or a later version, click

•For those using Excel 2000 or a later version, click on the **Test1** file on the taskbar at the bottom of the screen.

Click on the cell that you need.

For this exercise, select the A1 cell.
Press the Enter key.
OR
Press the button V of the formula bar.

The formula should be **=[ test1.xls ]Sheet1!\$A\$1**.The name of the file is between brackets, followed by the name of the worksheet, an exclamation mark and the cell address.

Save the file under the name Test2.xls.
Close the Test1.xls and test2.xls files.
Open once again the Test2.xls file.

Microsof	't Excel 🔀
1	This workbook contains links to other data sources.         • If you update the links, Excel will attempt to retrieve the latest data.         • If you don't update the links, Excel will use the previous information.         Note that data links can be used to access and share confidential information without your permission and possibly perform other harmful actions. Do not update the links if you do not trust the source of this workbook.         Update       Don't Update

Every time you'll open this file, it's going to ask you is you wish to verify and update the references of the other files. For this example, it's about the contents of the Test1.xls file. To update the file, you must press the Yes button. Otherwise, the file will use the same data from the last update.

You must also pay attention where you put the "linked" file. If you delete it, or move it or rename the reference file, Excel will not be able to find it.

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Type de fichier: Feuilles de calcul   Modifié en dernier: n'importe quand	Nouvelle <u>r</u> ech.
1 fichier(s) trouvé(s).	

If you moved or renamed the file, you will have to indicate to Excel the new location or the new name of the file. After you selected to correct file, press the **OK** button to update the link.

Microsof	t Excel
1	This workbook contains one or more links that cannot be updated. • To change the source of links, or attempt to update values again, click Edit Links. • To open the workbook as is, click Continue.
	Continue Edit Links

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Location: C:\Documents and Settings\roy_pa\Desktop Item:	
Update: <u>Automatic</u> <u>Manual</u> <u>Startup Prompt</u>	Close

You'll find more information about some Excel functions on <u>the chapter on</u> <u>functions and formulas</u> on this site.

### Edit a cell's content

Instead of having to rewrite the contents of a cell, you can change it's contents to correct "typos" or the formula. There are three ways to change a cell's content.

You must first place the cursor in the cell to be changed. Then,

Press the F2 key.
OR
Double-click in the cell to be modified
OR
Click in the formula bar to change the contents.

#### The worksheets

It's on the worksheets that you can write down the text, the numbers, the formulas and the other elements of our model. It's possible that you want to distribute your model on to several worksheets. Every worksheet has a name that you will find at the bottom of the screen. By default, they are called Sheet1, Sheet2. This next part is going you to demonstrate how to add worksheets, to rename them, to move them and even to copy a complete worksheet.

#### Add a worksheet

Even by placing your numbers on the worksheets that are shown, it's very possible that you need more worksheets. A spreadsheet can contain up to 100 worksheets.

From the Insert menu, select the Sheet option.
OR
Place the cursor on the tab of one of the worksheets.
Press the right mouse button.
From the context menu, select the Insert option.

### **Delete a worksheet**

For aesthetic needs or any other reason, it's always possible to remove a worksheet of the file.

Place the cursor on the worksheet that you want to remove.
From the Edit menu, select the Delete a sheet option.
Confirm the deletion by pressing on the OK button.

#### **Rename a worksheet**

It's much more practical to help you to find of the information you need when the names of worksheets are more familiar to you such as "Budget" or "Forecasts" instead of Sheet1. There are various ways to rename a worksheet.

From the Format menu, select the options Sheet and Rename.
OR
Double-click on the tab of the worksheet.
OR
Place the cursor over the tab of the worksheet.
Press on the right mouse button
From the context menu, select the Rename option.

### Move a worksheet

Excel offers you also the possibility to quickly move a worksheet in your spreadsheet. You can move them between other worksheets.

Place the cursor over the tab of the worksheet to be moved.
Press and hold the left mouse button, move the tab towards the left or the right according to your needs.

A small black arrow will indicate you the point of insertion if you Release the mouse button at this moment.

#### **Copy a worksheet**

Excel allows you also to copy all the contents of a working sheet with a variation of the last technique.

Place the cursor over the tab of the worksheet to be copied.
While pressing on the **Ctrl** key and on the **left** mouse button, move the new worksheet in the wished place.

Copy the contents without creating a new worksheet

Click the gray box of the upper left corner of the worksheet; between the " A " and " 1 " headers.

From the Edit menu, select the Copy option.
Place the cursor on the worksheet on that you want to copy the data.
Place the cursor in the cell where you want to insert the data.
From the Edit menu, select the Paste option.

### Split the screen

This option splits the screen into several windows. This is very practical when you want to compare data that's distant from one to another. For example, you want to compare this month's numbers with last year's or the forecast for next year. However, there is twelve months worth of data separates the two. The next exercise consists of showing you how to put two cells next to another by splitting the screen.

Open a new file or place the cursor on a new worksheet.
Place the cursor in the D6 cell.

•From the **Windows** menu, select the **Split** option.

	A	В	С	D
1				
2				
3				
4				
5				
6				

The worksheet is now separated into four parts. It's also possible to separate the screen only vertically or horizontally. Just above the vertical bar and to the right of the horizontal bar you will find the divider bars. You can place them in any place on the worksheet. You can also change the place any time or even to remove them. Just place the cursor on the divider bar, press and hold the **left** mouse button, and "pull" it in its new location.

•Press the **F6** key several times.

The **F6** key serves for moving from one zone to another. If you press it several times, you'll notice that the cursor moves in a clockwise fashion. The **Shift** and **F6** keys "turns" the cursor counter clockwise. Zones move in a synchronized way as you move horizontally or vertically.

To remove the divider bars

From the Windows menu, select the Delete the dividers option.
OR
Place the cursor on the divider bar.
Press and hold the left mouse button, move the bar towards one of the borders of the screen.
OR
Double-click on the divider bar to be removed.

### Freeze a part of the screen

On a worksheet, it's important to have titles that describe the numbers. It's important to see these titles at all times. After all, the numbers are used to describe something. The Excel designers, as well as the other spreadsheet programs available on the market, recognized this fact. The option to freeze part of the screen allows you to always have certain area visible on the screen.

	A	В	С	D
1		2005	2006	2007
2	Other	15	20	25
3	Carpets	25	30	35
4	Furniture	30	35	40

Write the text in the appropriate cells.
Place the cursor in the B2 cell.
From the Window menu, select the Freeze shutters option.
Press several times the PgDn (PageDown) key.

Although you moved on the worksheet, the text that you wrote above and to the left of the place that you fixed the shutters is always visible. To return to a normal page.

•From the **Windows** menu, select the **Release shutters** option.

# **Excel - Presentation**

## Introduction

Generally, it's not enough to create a model with the spreadsheet. You usually must be able to present the results to the other people; either your boss or your client. This page is dedicated to improve the presentation of your worksheets.

Here are some options that you can carry out to improve the presentation of your worksheets.

Change the font as well as the size and color of the text in the cells.
Add titles to each parts of the document.
Center the titles with regard to a series of cells.
Insert spaces between each of the parts of your document.

# **Improve the presentation of your worksheet**

Often, you have to present the results of your spreadsheet to other people. There are several possibilities to improve the presentation. Excel offers you these options in two different ways: by using the Format toolbar or from the main menu under the **Format** and **Cell** options.

### Format toolbar



If you don't see this toolbar in the screen, make the following operations.

From the Edit menu, select the Toolbar option.
 From the list of the toolbars that are available on you, select the one named Format.

The Format toolbar groups together several possibilities.

Arial	-	10	-	В	I	U
-------	---	----	---	---	---	---

You can change the font as well as its size. You can also put the text in bold, italic or underlined.



You can align the text or the number in the cell to the left, the middle or to the right side of the cell. You can also align the text on to several columns. This is designed to align a main title over several columns. Write the text in the cell to the leftmost of cells that you want to center. Make a block of all the cells in that you want to center the text. The leftmost cell should be the one that contains the text to be centered. Then press on the fourth button for the alignment, that the one with the letter " a " and two horizontal arrows.

### \$ % , .0 .00

You can also change the presentation of the numbers in cells. You can place the monetary format with two decimals, or the percentage format, or group together numbers by the thousands. You can also add or remove decimals in the presentation. But this is only for presentation purposes. It doesn't affect the real number in the cell. For example, if the true number of the cell is 12,4 and that you want to present it without decimal, the number that will appear in the cell will be 12. However Excel will use the "true" value to make any calculations. So, the result of the cell multiplied by 5 will not be 60 (5 \* 12) but really 62 (5 \* 12,4).





You can also change the presentation of the cell itself. You can frame the cells, or a group of cells, with various types of lines. You can also change the background color and the pattern for the cell. As the last option on this toolbar, you can also change the color of the text. It can be for one letter or the entire content of a cell.

### Format of the cell

The are other ways of changing the presentation of your file. In the main menu under the menu **Format** and **Cell** options, you will find *all* the options to change the presentation, including others that are not in the Format toolbar. You'll find all the options under the following six tabs.

Select a cell or a range of cells.
From the Format menu, select the Cell option.
If it's not already done, select the Numbers tab.

Format C	Format Cells 🔹 💽 🔀					
Number	Alignment	Font	Border	Patterns	Protection	
Category: General Number Currency Accounting Date Time Percentage Exertian		\$10	pie 0.00			
		<u>D</u> ecim <u>S</u> ymb	al places: ol:	2	\$	
		\$ <u>N</u> egal	ive number	's:	×	
Scientific Text Special		-\$1,3 \$1,2	234.10 34.10 234.10			
Special Custom		-\$1,234.10		~		
Currency formats are used for general monetary values. Use Accounting formats to align decimal points in a column.						
				ОК	Cancel	

In this window, there are six tabs that offer all the possibilities for the presentation of cells. As you go to see, there are a lot more options than what is available from the **Format** toolbar. Under the first tab you will find the options to change the presentation of numbers. In the categories box, there are several styles of presentation for numbers and text. You can even personalize the presentation according to your needs. In the right part of the window, you have options according to the style of presentation that you chose. In the image on the left side, you can determine the number of decimals that will be shown, the monetary symbol and the color of the number if it's negative. You can even personalize the numbers according to your needs.

Click on the Alignment tab.

Format Cells	? 🛛
Number Alignment Font Border	Patterns Protection
Text alignment	Orientation
Horizontal:	
General 💙 Indent:	<u> </u>
Vertical: 0	
Bottom	x lext
Justify distributed	•
Text control	_ [
Wrap text	
Shrin <u>k</u> to fit	0 🗘 Degrees
Merge cells	
Text direction:	
Context 💙	
C	OK Cancel

From this window, you can adjust the adaptation of the text inside the cell. You can paste the text on the straight or to the left or right side of the cell's border, in the height, middle or in the bottom the cell. One of the new options allows you to change the orientation of the text. You can also give an angle to your text! This is interesting for titles and some descriptions. However don't exaggerate its use.

From this window, it's also possible to merge or to " defuze" cells. To merge, it's first necessary to make a block with cells. Then, come to the window to the left to activate the " Merge cells " option. To remove the fusion, deselect the last option.

•Click on the **Font** tab.



To leave this window, you can change the presentation of the characters of the cell. You can change the font, its style, its size, the background and the color of the text from the other options.

Click on the Border tab.



From this window, you can determine the outline of a cell or of a range of cells. You can choose the style of line (none, simple, double, thick...) and the color of your choice of the right-hand side of the window. Of the left-hand side, you indicate the place you want the line by pressing on one of the buttons surrounding the outline. You can also click inside the outline to fix lines.

### •Click on the **Patterns** tab.

Format Cells	? 🔀 🖁
Number Alignment Font Borde	er Patterns Protection t
Cell shading Color:	a
No Color	t
	v v
Sample	
Pattero:	
Automatic	

Excel offers you also the possibility of changing the chorough color of cells and even to put it a pattern. Be sure that the text remains always legible even with a pattern.

•Click on the **Protection** tab.

Format Cells	This prac
Number       Alignment       Font       Border       Patterns       Protection         Locked       Hidden       Hidden <td>wan that use. that then Form prot cont Form hide prot two indic cells will ente text</td>	wan that use. that then Form prot cont Form hide prot two indic cells will ente text
OK Cancel	will canr

tab is very tical when you t to present a file other people may It's very possible you don't want n to change your nulas. You can ect cells aining your nulas, or even to them. The ection is made in stages. You cate to Excel the that you want to rotect. It's the that the others be#able use to r numbers or All other cells be locked and not be changed.

The second stage consists in protecting the worksheet or all the spreadsheet. When you'll have to unprotect the appropriate cells:

•From the **Tools** menu, select the **Protection** option.

Excel offers you the choice to protect the worksheet, the spreadsheet ( the file) or to be able to share the document with the other people.

•For the moment, select the **worksheet** option.

Protect Sheet	×
✓ Protect worksheet and contents of locked cells	
Password to unprotect sheet:	
••••••	
	-
Allow all users of this worksheet to:	
Select locked cells	
Format cells	
Format columns	
Insert columns	
Insert rows	1
Delete columns	
Delete rows	
	J

You can determine the elements of the sheet that you want to be protected. You can also put in a password to protect the worksheet or the file. It's however not compulsory. You can leave the empty box and the sheet will be always protected until it somebody removes the protection. Don't worry if you put the protection and forget the password. There are software or macro for Excel that exists "to crack" the password. It's going to take only a few seconds to discover and remove it. To find these software, use a research site and look the words crack or password and excel.

#### **Be careful!**

You cannot "crack" a password of a document without having first the permission from the owner of the file. Otherwise, you're in big trouble!!!

Try to change the contents of a cell.

Microsoft Excel 🛛 🔀				
1	The cell or chart you are trying to change is protected and therefore read-only. To modify a protected cell or chart, first remove protection using the Unprotect Sheet command (Tools menu, Protection submenu). You may be prompted for a password.			

As soon as you go to try to change a value, Excel will present you the message above. The software warns you that this worksheet is protected and that you cannot change the contents of protected cells. For the moment, remove the protection on the worksheet.

From the Tools menu, select the Protection option.Select the Remove the protection of the sheet option.

### Copy the presentation format

These last options offered to change all the options of the presentation. There is however a faster way to apply presentation style to other cells. You just have to copy an existing presentation style that's already in another cell by using the

 $\swarrow$  button. The next exercise demonstrates how to use this option.

	A	В	С	D
1		January	February	March
2	Revenus			
3	Product 100			
4	Product 200			
5	Product 300			

•Enter the text following in the appropriate cells.

If you don't see the toolbar with the **Solution**:

From the Edit menu, select the Toolbar option.
 Of the list of the available toolbars, activate the Standard toolbar.

It's first necessary to apply a presentation style to a cell.

•Place the cursor in the **B1** cell.

Press the button <sup>B</sup>.

It's now necessary to copy this format of presentation in the other cells of the example.

Make sure that the active cell is the B1 cell.

It's the format of presentation of this cell that will be copied on the others.

Click on the **C1** cell. B C D January February March

Press the *v* button .

The format presentation style for January was copied on to February. It would have also been easy to apply the format to a range of cells such as for every month. The problem with this technique is that it's necessary to press the

button every time you want to copy the presentation style. This is not practical for several blocks of cells.

The designers of Excel found an easy method to apply the same presentation style to several blocks. The next exercise consists of applying a presentation style to several separate cells.

•Make sure that the active cell is the **B1** cell.

●Double-click on the ✓button .

To click twice the  $\checkmark$  button will not be enough. It's necessary that you doubleclick.

Click on the D1 cell.Make a block with cells A3 for A5.

Press again on the *state* button to deactivate the option.

	A	В	С	D
1		January	February	March
2	Revenus			
3	Product 100			
4	Product 200			
5	Product 300			

You now see how easy it's to quickly prepare a presentation for your spreadsheet. There is an even faster way: the automatic format.

### Autoformat

You can spend a lot of time to try to improve the presentation of a file. Excel offers you predefined formats for presentation. It's enough to apply the presentation style of your choice to the area of cells that you want.

Select the area of your worksheet that you want to change the presentation.From the Format menu, select the Autoformat option.



Select the format of your choice for the range of cells you selected.Press the **OK** button.

	A	В	С	D
1		January	February	March
2	Revenus			
3	Product 100			
4	Product 200			
5	Product 300			

Here is what could look like your data by using one of the formats available. It took only a moment.

### **Conditional format**

The conditional format allows to change the presentation only when a series of events apply. For the example below, one wants that the available quantity changes the red when the quantity is lower than the minimal quantity. It makes easier to notice the number and to command or to produce the others.

	A	В
	Quantities	Minimal
1	available	quantity
2	200	100
3	250	50

Enter the text and the following numbers the appropriate cells.

#### Note:

To be able to enter several lines of text in the same cell, you must use the **Alt** and **Enter** keys.

#### Place the cursor in the A2 cell.

•From the **Format** menu, select the **Conditional Formatting** option.

Conditional Forma	atting			
Condition 1				
Cell Value Is 🔽	less than	Y	=\$B\$2	<b>N</b>
Preview of format t when condition is tr	between not between equal to		AaBbCcYyZz	<u>F</u> ormat
L	not equal to greater than less than		Delete OK	Cancel
	greater than or equal to less than or equal to	~		

You must now write a condition and to choose a kind of presentation when this condition occurs.

•For the first box, leave the option to **The value of the cell is**.

The second box determines the kind of condition. As you notice it's very complete list.

•For the second box, select the **Less than** condition.

For this condition, you want to compare it with the contents of the **B2** cell.

For the third box, write in the box =B2.
OR
Press the button in at the right of the box.
Select the <b>B2</b> cell.
Press the 🗾 button.

Format C	ells		? 🛛
Font	Border	Patterns	
Font:	icy FB tus Extra B tus Medium ian	iold	Font style:     Size:       Bold     9       Italic     9       Bold     10       Bold Italic     11
<u>U</u> nderline:		~	
None Single Double	cript	······································	Preview AaBbCcYyZz
For Condit Underline,	ional Forma Color, and	atting you c Strikethrou	an set Font Style, Clea <u>r</u>
			OK Cancel

It's also possible to add up to 3 conditions and to change the presentation under different circumstances. You just need to press the Add button to add another condition. For the moment, there are no need for another condition.

### Press the OK button.

The conditional format is placed in the **A2** cell. It's time to test it.

Change the number of the cell A2 to 50.

	A	В
	Quantities	Minimal
1	available	quantity
2	50	100
3	250	50

Here is the result. The number is now in red. This happens only when the number of this cell is lower than the minimal quantity declared in B2 cell. You can add conditions or remove them. Experiment with different numbers and think where you could apply this option in your models.

Excel also allows you to copy the conditional format with the  $\checkmark$  button. The <u>relative and absolute references</u> apply also to the conditional format. In the last example, there is a difference between **=B2 and =\$B\$2** when you go to copy the format on to other cells.

# Excel - Page setup and printing

## Introduction

Excel allows you to print your document as well as to bring it additional page layout options to your presentation. You can add a header or footer to a page, change the margins as well as several other options. This page shows how to setup your printout as well as the options for printing. You'll then be able to improve the presentation of your file on paper.

### Page setup

The options of the page layout exist to improve the presentation of your document on to paper. You can change the margins of sheets, add the headers and footers and several other options that will be discussed below.

Page Setup	? 🛛
Page Margins Header/Footer Sheet	
Orientation	Print
A O Portrait A O Landscape	Print Previe <u>w</u>
Scaling	Options
O Fit to: 1 🗘 page(s) wide by 1 🛟 tall	
Paper size: Letter	
Print guality: 1200 dpi	
First page number: Auto	
ОК	Cancel

From the **File** menu, select the **Page setup** option.

Under the **Page** tab, you will find the first options for the presentation of the file on to paper. In the first block, Excel asks you for the orientation of the pages to print. The second block asks you the scale you want to print your file. It's important when one of the columns you want to print falls on the next page instead of the page that you would have wished. You can manually change the scale to reduce or increase the size of your spreadsheet. You can also ask to Excel to find automatically the best size to enter your document on to X pages in widths and Y pages in height. At any time, you can look at the printout before printing by pressing the review button. You can also change the type of paper (letter size, legal, newspaper ...) as well as the quality of the printing. For printing in the computer lab, be sure that the paper size is always " US Letter ". The last option allows you to choose the page number that will begin the printout. For example, the first page of your printout could be numbered page 5 and so on.

# Dr. RACHINI Ali – Microsoft Excel – Page setup and printing

Page Setup			? 🛛
Page Margins	Header/Footer	Sheet	
	<u>T</u> op: 2.5	He <u>a</u> der: 1.3 🛟	Print Previe <u>w</u>
Left: 1.9 🗘		<u>R</u> ight: 1.9	 Options
	Bottom:	<u>F</u> ooter:	
Center on page			
Horizontally	Vertically		
			OK Cancel

Under the **Margins** tab, you can determine the margins, the width between the border of the page and your text, for the file as well as those for the header and the footer of the page. You can also choose to center horizontally and vertically your worksheet on the page. You can also determine the place for the header and the footer for the worksheet your about to print. The outline in the middle of the window gives you an idea of the effect of these choices on the paper.

Page Setup			? 🛛
Page Margins	Header/Footer	Sheet	
	<u>T</u> op: 2.5	He <u>a</u> der: 1.3 🛟	Print Print Previe <u>w</u>
Left: 1.9 文		Right:	Options
Center on page —	Bottom:	Eooter:	
Horizontally	Uertically		
			OK Cancel

Under the **Header/Footer** tab, you can determine what will be in the header and the footer of each of the pages of the printout. If you don't want a header or footer, select the first option, "none", from the list of the predetermined options.

### Personalize the header and footer.

It's sometimes worthwhile to add a header or footer to a document. It helps to identify the document and what it's supposed to represent. For example, a header with the title "Monthly revenues and expenses for May 2006" says it all. The next exercise consists in writing the name of the document, your name as well as the date and the hour of the printout.

### •Under the **Header/Footer** tab, press the **Custom Header** button.

Header				X
To format text: select the text, then choose the font button.       OK         To insert a page number, date, time, file path, filename, or tab name: position the insertion point in the edit box, then choose the appropriate button.       OK         To insert picture: press the Insert Picture button.       Cancel         Cursor in the edit box and press the Format Picture button.       Cancel				
	A 💌 🗄	<b>1</b> 0 📦 😫		M (1)
Left section:	<u>⊂</u> enter	section:	R	ight section:
&[File]	Yo	our first name and name	<	Date &[Date] at &[Time] <pre></pre> Page &[Page] of &[Pages]

The options to personalize the header will appear as above. These are the same options for the page footer. In the middle of the window, there is a series of buttons with the most often used options. The section at the bottom is separated into three boxes. The left box will contain the text that will be written on the left side of the page. The box in the middle will contain the text that will be in the middle of the header and so on.

C	lick	in	the	left	box.

Press the button to insert the name of the file.

- Click in the box of the middle.
- •Write your first name and name.
- Click in the box of the right-hand side.

•Write: **Date:** and press the and buttons.

The current date and time and the time of the printout will appear on the right side of the header.

#### Press the **Enter** key.

You can write many lines in a header or footer. The next part consists of adding the page number and the total of pages in your printout.

# Dr. RACHINI Ali – Microsoft Excel – Page setup and printing

Write Page and press the button.
Write of and press the button.
Press the OK button.
Press the Preview button
Press the zoom button to better see the header.

The result should look like this.

Book1	Your first name and name	Date 13/04/2006 at 4:29 AM
		Page 1 of 4

This last exercise demonstrated what you can use the options, write text or to combine both to give you a better result. It's also possible to write as many lines as you need in the header or footer.

Press the Close button to return to the page layout options.Click on the Sheet tab.

Page Setup	? 🔀
Page Margins Header/Footer Sheet	
Print <u>a</u> rea: Similar Second S	Print Print Preview
Columns to repeat at left:	Options
Gridlines Row and column headings	
Black and white     Comments:     (None)       Draft guality     Cell errors as:     displayed	
Page order         O Down, then over         O Ver, then down	
ок	Cancel

Under the **Sheet** tab, you can determine what range of cells will be printed in the printing zone box. You can determine that area of your worksheet will be printed. Instead of printing all the contents of a worksheet, you can choose to print only a part of it.

The titles boxes are very practical. Often, you use the first lines and the first columns in a worksheet to write the important titles such as: income, charges, gross profit, net profit, a list of the months, a list of items or important accounts etc. But these titles will not be reprinted on the second page or the following pages unless you force Excel to make it so. This option will reprint the selected lines and columns on to every page. Be careful not to put these lines and columns in the printing zone. Otherwise, these are going to be printed twice on the first page of your printout.

You also have access to the other options to print the grid on all the pages, to print in black or white or in "draft" mode if you wish it. It's also possible to print the lines and columns headings (A, B, C, 1, 2, 3...) and even your comments.

### The printing zone

Besides allowing you to print your entire spreadsheet, Excel allows you to print a part of your worksheets. It's however necessary to determine in advance the printing zone that you need. There are several ways to carry out this task.

From the File menu, select the Printing zone and Define options.
Make a range of cells with the area that you need to print.
OR
From the File menu, select the Page Setup option.
Select the Sheet tab.
Click in the Print area box.
Select the range of cells that you need to print.

While pressing on the **Ctrl** key, it's possible to you to select several zones of printing at the same time. However, every zone will be printed on a different page.

# Printing

If you press the button, Excel will print all the contents of the worksheet shown on the screen or according to the options that you chose in the page layout option just covered above. You can however control some options for printing. The next part explains these options.

•From the File menu, select the Print option.

Print			? 🛛
Printer Na <u>m</u> e: Status: Type: Where:	HP LaserJet 4000 Series PCL6 (from Idle HP LaserJet 4000 Series PCL6 TS001	Compaq) 🔽	Properties Fin <u>d</u> Printer
Comment:			Print to fi <u>l</u> e
Print range <ul> <li><u>A</u>II</li> <li>Page(s)</li> </ul> Print what	Erom: <b>1</b> o:	Copies Number of copies:	
<ul> <li>○ Selectio</li> <li>O Active s</li> </ul>	n OEntire workbook heet(s) List		
Previe <u>w</u>		ОК	Cancel

The window offers you several options. In the first box, you can choose the type of printer on witch your document will be printed. If you work in an office, it may be possible that you have access to more than one printer. For example, you could have access to a laser or and ink jet printer or even a color printer.

Excel offers you the options to print your entire document or only some pages specified by your file. That's very practical when you need to reprint a few pages after a correction. In the print section, Excel offers you to print the block that you selected first or only to print the worksheet where the cursor is or to print all the worksheets of your file that contains a number, text or a formula.

In the middle left of the window, you may choose the number of copies that Excel will print.

# Page break

The previous parts of this page showed you how to change the presentation of the document on paper and the options for printing. But what if you wanted a part of the document to always be at the start of a new page? Excel offers you the possibility of putting in page breaks at any place in a worksheet. The next part of this page demonstrates how to use page breaks.

Place the cursor in the B2 cell.From the Insert menu, select the Page break option.

	A	В
1		
2		

The page break will be placed above and to the left of the active cell. The dotted lines indicate the separation between pages to be printed.

### To remove a page break.

Place the cursor in the cell in the intersection of page breaks. For the exercise, place the cursor in the B3 cell.

•From the **Insert** menu, select the option **Delete Page Break**.

In that case, the vertical page break will be deleted but not the horizontal page break. The **B3** cell was only tied to the vertical page break. Any cell in the B column, apart from **B2**, would have need able to delete the vertical page break. The **B2** cell could erase both vertical and horizontal page breaks.

Place the cursor in the **B2** cell and delete the horizontal page break.

### To insert only a vertical page break.

Click on the letter of the column that you want to insert the page break. For the exercise, select the **B column**.

•From the **Insert** menu, select the **Page break** option.

	A	В
1		
2		

The page break will be placed on the left-hand side of the selected column.

Delete the page break.

### To insert a horizontal page break.

Click on the number of the line that you want to insert the page break. For the exercise, select line 2 by pressing on the grey box with the number 2.
From the Insert menu, select the Page break option.

	A	В		
1				
2				

The page break will be placed above the selected line.

•Delete the page break.

### **Outline of page breaks**

The preview page breaks option shows to you what the document will look like on paper. But before, you must prepare the worksheet by entering some numbers and a page break.

Enter the number 1 in the A1 cell.
Enter the number 2 in the B2 cell.
Enter the number 3 in the C3 cell.
Enter the number 4 in the D4 cell.
Enter the number 5 in the E5 cell.
Enter the number 6 in the F6 cell.
Place the cursor in the C3 cell.
From the Insert menu, select the Page break option.
From the View menu, select the Page break preview option.

Welcome to Page Break Preview 🛛 🔀			
You can adjust where the page breaks are by clicking and dragging them with your mouse.			
Do not show this dialog again.			
ОК			

Excel gives you a message to inform you that it's possible to move the page breaks to better answer your needs.

If you don't want to see this message anymore, click in box in the window and press the OK button.

# Dr. RACHINI Ali – Microsoft Excel – Page setup and printing

	A	В	С	D	E	F
1	1	ao 1		D.	70.2	
2		2		10	30.0	
3			3			
4	Dad	10.2		D-4	10.4	
5	1 45	JC 2		1 ag	5 5	
6						6

Excel will show you the worksheet by indicating the contents of the pages and the page breaks will appear. You can move the page break by placing the pointer on them, pressing and holding the **left** mouse button and moving it around.

To deactivate the option and return to the normal presentation, of the View menu, select the Normal option.
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# **Functions**

**Introduction** 

<u>=Sum()</u>
<u>=average()</u>
<u>=min()</u>
<u>=max()</u>
<u>=rand()</u>
<u>=abs()</u>
<u>=round()</u>
<u>=roundup()</u>
<u>=rounddown()</u>
<u>=int()</u>
<u>=fact()</u>
<u>=mod()</u>

=count() =counta() =countif() =countblank() =sumif() =sumif() =odd() =sqrt() =sign() =trunc()

#### Functions that applies to text

<u>=right()</u> <u>=left()</u> <u>=concatenate()</u>

<u>=nbcar()</u> <u>=roman()</u> <u>=text()</u>

#### Functions that applies to a date or time

=now()
=today()
=year()
=month()
=day()

=workweek()
=hour()
=minute()
=second()

Insert a function

<u>=If</u> =Vlookup, Hlookup

## Introduction

The biggest advantage of functions is that they are ready to be used. You don't have to recreate them or to look for them in books to find the one that you need. Excel's help file can help you find what you need. You just need to press the **F1** key to have access to it.

#### Be careful! This applies to all functions.

Don't leave a space between the name of the function and the first bracket like: =sum (.... The function won't work. The correct way would be =sum(... This is a common mistake among beginners.

To complete the next functions, fill in the cells with numbers and text in the appropriate cells.

1		100
2		200
3		300
4		
5	Sum	
6	Average	
7	Minimum	
8	Maximum	

## The Sum function and the AutoSum button

The =sum function is very probably the one most often used functi $\Sigma$  on in Excel. The program offers you two ways to use this function: by writing the formula or

by using the Autosum button  $\Sigma$ . You can simply write the formula =sum( as often as you wish. The character ":" must be placed between the starting cell and the ending cell of the range of cells you want to add. For example, to find the sum for the area between cells **B1** and **B3**, the formula will be =sum(B1:B3). A range of cells can include several lines and several columns.

In the B5 cell, enter the following formula: =sum( B1:b3 ).

The result should be 600.

Change one of the numbers in the **B1** to **B3** cells.

The new sum will be displayed in **B5** cell.

There are several ways of writing a formula. You can write a formula by writing it manually or by using the cursors or the mouse to select the proper cell that you will need in the formula. The next three exercises are going to demonstrate how to use these three techniques to find the sum between the **B1** to **B3** cells. Once you've have mastered these techniques, you can use them for any functions and formulas.

Place the cursor in the **B5** cell.Press the = key.

You can always start a formula with the +, - or = mathematical operators.

Press the up cursor, move it to the B1 cell.

	A	В
1		100)
2		200
3		300
4		
5	Sum	=B1

Please notice that there is a box around the cell that flashes. It's to reassure you that you selected the right cell. You can't confuse it with the other cell on your worksheet.

Press the + key.

Noice that the cursor returned to the **B5** cell, where it will continue to write the formula. As soon as you press one of the mathematical operator keys  $(+,-, *,/, ^)$  or a bracket, the cursor always returns to the cell where it's writing the formula.

Use the up cursor to move to the B2 cell.
Press the + key.
By using the up cursor, move to the B3 cell.
Press the Enter key.

The formula is finished. The **B5** cell will show the result of the formula. That's one way to write the formula. It's an easy way to write a formula if you don't have many cells to add up. But it may be the only way if you're using many different mathematical operators. For example, the sum() function won't be of any use to write this formula: =b1\*(1+b2)/b3. The next exercise consists adding the same cell using the sum() function and by selecting an area of cells using the cursors.

Place the cursor in the B5 cell.

•Write the following formula: =sum(.

By using the up cursor, move the active cell in the **B1** cell.

While pressing on the **Shift** key, use the down cursor to move to the **B3** cell.

	A	В	С	D
1		100		
2		200		
3		300		
4			38 x 1C	
5	Sum	=sum( <mark>B1:E</mark>	33	
6	Average	SUM(number1, [number2],)		

The block is selected. The **Shift** key allows you to select a range of cells on witch you can do some operations. That can be from using them in a formula, changing their presentation or even deleting their content. You can do an operation on many cells instead of just one.

End the formula by pressing on the ")" key.Press the Enter key.

As just demonstrated it's also possible to select an area of cells by using cursors and the **Shift** key. You can have the same result by using the mouse. That's the next exercise.

Place the cursor in the cell B5.
Write the following formula: =sum(.
By using the mouse, click on the B1 cell.
Press the left mouse button and select B1 to B3 cells.
End the formula by pressing on the ")" key.
Press the Enter key.

This last exercise demonstrates that it's possible to select an area of cells as much with the mouse as with the cursor keys.

The AutoSum button is much simpler. But, it has its limitations you should be aware of.

•Place the cursor in the **B5** cell.

•Press the  $\Sigma$  button.

Excel will offer you the formula: the sum of the **B1** to **B4** cells or =sum(B1:b4).

To confirm the formula, press the **Enter** key.

But how did the function determined the right area? The AutoSum function first looks upward to determine if there are any numbers to add up. If there are no numbers in the two cells directly above the active cell, the AutoSum will try to find numbers to the left of the cell.

In the example above, it does not find numbers in the **B4** cell just above. But it does find a number in the **B3** cell. The function moves up the column until it finds an empty cell. At that moment, it stops and suggests you an area (=sum(B1:B4)).

This option is very practical. The problem is that it can stop at the wrong place. If you have a cell that's empty from the block, the function will stop there, even if you wanted to have the other numbers above that empty cell. Be sure that the function selects the right area of cells before confirming by pressing on the **Enter** key.

#### =Average(range of cells ex.: A1:D5)

Finds the average for an area or range of cells.

In the B6 cell, write the following formula: =average( B1:b3 ).

#### =Min(range of cells)

Finds the smallest value among an area of cells.

In the B7 cell, write the following formula: =min( B1:B3 ).

#### =Max(range of cells)

Finds the highest value among an area cells.

•In the **B8** cell, write the following formula: =max( B1:B3 ).

#### =Rand()

This function generates a random number between 0 and 1. It's often used during simulations. You can change te random number by pressing the **F9** key. You can also combine this function with other to make it more useful. The next example generates a number between 700 and 1000. The lowest possible value is 700 and

the maximum is 1000. The difference between them is 300. You can use one of these formulas to generate a number between 700 and 1000: =ROUND((RAND()\*300)+700,0) or =INT(RAND()\*300)+700. The function used in combinason with =rand() will be explained later on this page.

#### =Abs(cell or value)

Shows the absolute value, or positive value, of any number.

number Abs(number)

25 25

-43 43

#### =Round(cell,number of decimals)

Allows to round a number to the decimal place of your choice. You must enter the number, or the cell address where the number is located, and the number of decimals you need.

Number	Round(number,0)	Round(number,1)
45.15	45	45.2
45.49	45	45.5

45.54 46 45.5

You can also round to the unit, to tens or the hundreds and so onby putting a negative value on the number of decimals.

Ex.: = round(45, -1) = 50

These options also applies to the next two functions.

#### =Roundup(cell,number of decimals)

This function rounds up a number at the decimal place of your choice. A value will be rounded up even if there is just a faction after the decimal of your choice.

number	roundup(number,0)	roundup(number,1)
45.15	46	45.2
45.49	46	45.5
45.54	46	45.6

#### =Rounddown(cell,number of decimals)

This function function "removes" any fraction after the decimal place of your choice.

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number rounddown(number,0) rounddown(number,1)

45.15	45	45.1
45.49	45	45.4
45.54	45	45.5

#### =Int(cell)

Shows the Integer of a value. It removes all the fractions after the decimal point.

number	Int(number)
25.99	25
43.55	43

#### =fact(number)

Shows the factorial of a number. It's very useful calculating propabilities. Ex.: =fact(3) = 6 (1 \* 2 \* 3)

#### =mod(number,divider)

Shows what remains of a division. Ex.: = mod(13.4) = 1 .Thirdteen (13) divided by 4 is equal to 3. It remains 1.

#### =count(range of cells)

Counts the number of cells with a number, not text or empty, within a selected range of cells.

#### =counta(range of cells)

Counts the number of cells that have some content, that are not empty. The can either have numbers, text or formulas.

#### =countif(range of cells,criteria)

Counts the number of cells that have the same content as the criteria. The next exercise shows the number of cells that contain the number 100. The formula entered in the **B1** cell is =countif(A1:A3,100) .

	A	В	С
1	100	=countif(A	1: <mark>A3</mark> ,100)
2	200		
3	300		

Enter les numbers and formula in the appropriate cells.

•Enter the number **100** in the **A2** cell.

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	A	В
1	100	2
2	100	
3	300	

The result of the =countif() now shows that two cells contain the number 100. It's also possible to use this function to find if there are any other cells within a range that have the same value. You must combine the =countif() with the =if() function. The formula is =if(countif(range of cells,criteria)>1,"Double","Unique").

	A	В
1	100	2
2	100	Double
3	300	

Place the cursor in the B2 cell. Enter la formule suivante: =if(countif(A1:A3,A1)>1,"Double","Unique").

For this example, the formula checks if the number that's in the A1 cell appears more than once within the range of A1 to A3. If that's the case, the result will show "Double".

#### =sumif(range of cells,criteria)

This function adds numbers that have the same value.

Place the cursor in the B3 cell. Enter this formula: =sumif(A1:A3,100).

	A	В
1	100	2
2	100	Double
3	300	200

With this example, the function will add all the cells in the range that have the number100. Since there are two cells with that number, the result will be 200.

#### =countblank(range of cells)

Counts the number of empty cells in the selected range of cells.

#### =even(number)

Shows the next even number if the number isn't already even.

number even(number) 2 2 4

3

```
=odd(number)
```

Shows the next odd number if the number isn't already odd.

number odd(number) 3 3 4 5

## =sqrt(number)

Shows the square root of a number or from the content of a cell. Ex.: = sqrt(9) = 3

#### =sign(number)

At times, it's useful to know not the value of a cell but it's sign. This function shows 1 if the number is positive, 0 for 0 and -1 for a negative value. The equivalent could be done with this formula =if(number>0,1,if(number=0,0,-1)).

number =sign(number) 45 1 0 0 -45 -1

#### =trunc(number,number of decimals)

Shows the number with the number of decimals desired. It's the equivalent of the =rounddown() function.

## Functions that applies to text

Excel also has some functions that can help you get more out of the content of text cells. Here are some examples.

#### =right(text,number of caracters)

Shows the n caracter from the right of a cell with text.

ex.: =right("This is an example",2) = le

#### =left(text,number of caracters)

Shows the number of caracters from the left of a cell with text.

Ex.: =left("This is an example",2) = Th

#### =concatenate(first cell,second cell)

This function allows you to group the content of many cells together even if it's as different as text numbers dates or the result of a formula.

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Ex.: =concatenate("Ce",45) = Ce45

#### =len(cell or text)

Shows the number of characters in a cell. Ex: =len("abcde") = 5

#### =roman(number)

Converts a number to its roman equivalent. Ex.: =roman(45) = XLV

#### =text(number,text format)

Converts a number into text format. It will take the presentation format as any other cell containing text. It's still possible to use the content for mathematical operations or in formulas. Ex.: =text(45,0) = 45 but the text is placed on the left border of the cell.

## Insert a function that applies to dates or time

Excel also offers functions that allows to get information on cells containing dates and time. These cells contain a lot of information. Here is a list of the functions of this category that most often used.

#### =now()

Shows the exact time at the moment you confirmed the content of the cell. It will also update itself every time you enter or change a value in a cell.

#### =today()

Shows the computer's date, whether is right or not.

#### =year(cell with a date)

Shows only the number for the year that's inside a date.

#### =month(cell with a date)

Shows the month that's inside a date. The result will always be between 1 and 12.

#### =day(cell with a date)

Shows the number of a day that's inside a date. The result will always be between 1 and 31.

#### =workweek(cell with a date)

Shows a number that represents a number for the day of the week: 1 =sunday, 2 =monday ... 7 =saturday. You can combine this function with =if() or vlookup() to show the day of the week instead of just a number.

#### =hour(cell with time)

Shows the hour that's inside a date or a time. The result will always be between 0 and 23.

#### =minute(cell with time)

Shows the minutes that's inside a date or a time. The result will always be between 0 and 59.

#### =second(cell with time)

Shows the seconds that's inside a date or a time. The result will always be between 0 and 59.

#### **Insert a function**

Let's take the following example. You want to know how much will be your monthly payments if you take a 25 years mortgage at an annual rate of 6,5 %. There is already a function in Excel to help you to find the amount.

•Enter the text, the number and the following formulas in the appropriate cells.

	A	В
1	Amount	100000
2	Interest rate	6.50%
3	Payments/year	12
4	Years	25
5		
6	Payment	

These formulas deserve a few explanations. The rate should be that for each payment periods and not the annual rate. To find the number of payments, it's necessary to multiply the number of years with the number of payments made during a year.

•Place the cursor in the **B6** cell.

From the Insert menu, select the Functions option.
 OR

	Σ	-	
		<u>S</u> um	
		<u>A</u> verage	
		Count	
		<u>M</u> ax	
		Min	
Press the		More <u>Functions</u>	button.

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IJ	isert Function 🔹 💽 🔀	The left of the funct
S	earch for a function:	The right
	Type a brief description of what you want to do and then <u>Go</u>	category
	Or select a <u>c</u> ategory: Financial	columns, descripti
s	elect a functio <u>n</u> :	that's no is help at
	IPMT A Strength of the second	the 0 bu
	PMT(rate,nper,pv,fv,type) Calculates the payment for a loan based on constant payments and a constant interest rate.	
Ħ	elp on this function OK Cancel	

column groups together tions into categories. t column shows the the functions for that . Below these two , there is a brief on of the function. If t enough for you, there t the bottom of the by pressing



•From the left column select the **Financial** category.

From the list of functions in the right column, select the **PMT** function. Press the OK button.

Function Arguments				
PMT				
Rate	💽 = number			
Nper	💽 = number			
Pγ	💽 = number			
Fv	🔜 = number			
Туре	🔤 = number			
= Calculates the payment for a loan based on constant payments and a constant interest rate. <b>Rate</b> is the interest rate per period for the loan. For example, use 6%/4 for quarterly payments at 6% APR.				
Formula result =				
Help on this function	OK Cancel			

The PMT function window of the will appear. It shows the boxes that need information for the formula to work. The titles that are in bold (rate, number of periods and present value) are required. The titles that are of standard size (Fv and Type) are compulsory.

You must enter the amounts in the boxes or to indicate the function in the cell that will find wanted amounts. For the exercise, it will be boxes B2, B3 and B1 respectively.

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You can write the cells addresses in the boxes or you can use the button at the end of the box to select the desired cell.

•For this exercise, press the button at the end of the rates box.

The function window disappears. A smaller window with only the information on rate is shown. You must now choose the cell where the rate for the loan is contained.

Click on the **B2** cell.

Function Arguments	×
B2/B3	F

Press on the " / " key .
Click on the B3 cell.

•To end the operation and return to the function window, press the 🖭 button at the end of the box.

Function Arguments				
PMT				
Rate	B2/B3	<b>1</b> = 0.005416667		
Nper	B3*B4	<b>1</b> = 300		
Pv	B1	<b>100000</b>		
Fv		💽 = number		
Туре		🚺 = number		
<ul> <li>= -675.2071613</li> <li>Calculates the payment for a loan based on constant payments and a constant interest rate.</li> <li>Fv is the future value, or a cash balance you want to attain after the last payment is made, 0 (zero) if omitted.</li> </ul>				
Formula result =	-\$675.21			
Help on this function	L	OK Cancel		

 Use the same technique to select the cell for the number of payments and for the amount of the mortgage.
 Press the **OK** button.

The result of the function should be -337.60 \$. To avoid the negative amount, you can put the - (minus) sign in front of the function (-PMT (...)) or in front of the amount of the mortgage (**B1**). You can now change the amounts and the rate to better suit your needs. You'll be able to better plan the amount you need to buy your first house. Don't forget to add to that, as a home owner, you'll have property and school taxes to pay, maybe a water tax and home maintenance cost that you didn't have before.

Excel offers you several other functions in different categories. Experiment with these before needing them in your work.

These functions help you to create models that are closer to reality. The IF function allows you to adapt the model according to different situations. For example, is there a premium to be paid? Are there overtime hours to be paid?

## =If

The =If function is very practical in a model because it gives you can adapt your model to different situations. For example:

➡After a certain number of hours, the employees have a right to overtime pay.➡After a certain amount of payment, the tax rate increases.

When the shop is full, there are expenses to ship and store excess inventory elsewhere.

When a customer buys certain number of a product, he may have a right to a discount.

The number of possibilities is infinite! The other functions, with the exception of **=Vlookup and =Hlookup**, don't offer what this function can offer: a choice, some flexibility for your model. It will give a certain result if the condition is realized. Otherwise, another result will appear.

The **=If** function requires three parameters to work. The first is the condition: what does it have to compare? The second part is what the function should show when the condition is true. The third part is what the function should show when the condition is false. You can summarize this: =If(condition, if true, if false). The semicolon (,) is used to separate the various parameters of the function. That's also true for every other function in Excel.

Ex: =If(B1>=10,b3\*0,1,0) If the contents of the **B1** cell is superior or equal to 10, show B3's result multiplied by 0,1. Otherwise show zero.

To help you understand how the =If function works, and its potential, the next part will have some exercises for it. This is the case of a businessman who wants to offer a discount to its customers if they buy a certain quantity.

Before we begin, open a new worksheet or a file.Fill the following cells with the text and formulas.

	А		В	
1	Quantity			
2	Unit price \$ 10.0			
3	Total	\$ -		
4				
5	If with text			
6	lf at 10%			
7	lf at 5% or 10%			
8	Vlookup			

For the first example, the businessman wants to offer a still undetermined discount if the customer buys 10 identical items or more. This exercise is just to show whether or not the customer has a right to a discount or not. The result of

this =If function will only be text, not a number or a formula. Those will come later.

In the B5 cell, write the following formula: =If(B1>=10,"Discount ","Sorry, no discount ").

According to the quantity that's entered in the **B1** cell, the **B6** cell will show either "Discount" or "Sorry, no discount " (without quotation marks). As mentioned before, this function has the three parts. In the first part, **B1>=10** is the condition. It verifies that the contents of the **B1** cell is superior or equal to 10. If true, the function shows the second part of the function (Discount). Otherwise, it shows the third part (Sorry, no discount). The result of this function is posted as text. The next function will have for result a formula or a number.

Enter different amounts in the B1 cell to see how the B5 cell reacts.

The businessman has decided to offer a 10 % discount to those who buy 10 identical items or more. The next formula will calculate this discount.

■In the **B6** cell, enter the following formula: =**If(B1>=10,b3\*0.1,0)**.

For this formula, the condition is the same that the previous formula. Nevertheless, the result is different. The discount will change according to the quantity in the **B1** cell. If the quantity equals or higher than 10, there will be a 10 % discount on the total in the **B3** cell. Otherwise, there is no discount. So, the number will be zero (0).

•Enter different amounts in the **B1** cell to see how the **B6** cell reacts.

The third exercise consists of seeing the =If functions been linked. It's possible to have if() functions inside a =If () function. In fact, it's possible to have functions in functions. For example, =abs(sum(B1:B200)) gives you the absolute number of the sum of **B1** to **B200** cells. It's possible to imbricate up to six if() inside each other. The next exercise gives you the example of this.

The businessman notices that his discount does not make any sense to most clients. They don't buy that many. He then offers a 5 % discount to those who buy 5 identical items or more. He also wants to give a 10 % discount if a customer buys 10 identical items or more.

# In the B7 cell, enter the following formula: =IF(B1>=10,B3\*0.1,IF(B1>=5,B3\*0.05,0)).

The function verifies first if the quantity registered in the cell is superior or equal to 10. If true, the function will show a 10 % discount on the number in the B3 cell. Otherwise, there is the second if() that verifies if the quantity is superior or equal to 5. If true, it will show a 5 % discount on the number of the B3 cell. Otherwise, there is no discount. So, the shown number will be of zero (0).

There is another possible formulation that would have given the same result. =If (B1>=5,if(B1>=10, b3\*0,1,b3\*0,05),0). Instead of beginning with the biggest possibility (>=10) and decent from there, this formula begins with the smallest possibility (>=5) and rises! There are certainly one or two other formulations that are possible.

It's possible to " imbricate" up to 6 levels of Ifs. But at that level, it becomes very difficult to manage. The =Vlookup and =Hlookup functions will be easier to use when you have several possibilities.

The function =If () can be improved when it's used with other functions such as =And() and =Or(). The next part demonstrates the functioning of these two functions followed of how they can be used with =If().

=AND(condition1, condition2, condition3)	A minimum of two conditions is required. But you can add as many as needed. All the conditions must be realized for the function to be true. Otherwise, it will false.
=OR(condition1,	A minimum of two conditions is required. You can

A minimum of two conditions is required. You can add as many as required. One of the conditions must be realized for the function to be true. If none of the conditions is realized, it will be false.

It's time see them in practice.

condition2,

condition3...)

	E	F
1	0	=AND(A1=1,A2=1)
2	0	=OR(A1=1,A2=1)

Enter numbers and formulas in the appropriate cells.

With these numbers, you should see the **"FALSE"** in cells **B1** and **B2**. The numbers don't answer the conditions in either formula. For the = And() function to work, the cells **A1 and A2** must be equal to 1, the necessary conditions for that function to be true are not yet met. It's the same situation for the =Or() function.

Enter the number 1 in the **A1** cell.

This should bring a change to the =Or() function because one of both conditions is realized. The **B1** cell still shows false because all of the conditions are not yet met.

•Enter the number 1 in the A2 cell.

Because both conditions are now true, the =And() function will now show TRUE.

•Enter the number 2 in the **A1** cell.

The result was predictable. The **B1** cell shows false whereas the **B2** cell will still shows true. If you want, you can add other conditions to these functions. Here is a small example: =Or(A1=1, A2=1, A3=1). This can go far, very far.

It's possible to add these functions, and many others, in the =If() function. For these last two functions, it's better place them in the part of the conditions.

=If(and(a1=1,a2=1),1000, 0) =If(or(a1=1,a2=1),1000, 0)

=Vlookup, =Hlookup

The =Vlookup and =Hlookup functions are forms of the =If function that are a little more developed. It's possible " to imbricate " up to 6 if functions to answer several possibilities. But what can you do if you want to answer a question that needs more than 6 levels? At that level, it becomes difficult to manage every imbricated =Ifs.

It's easier at that point to use a Vlookup or Hlookup function especially when you have a grid or a comparison table ready to use. For example, using a grid to determine a student's grade or the grid to determine the tax rate of the employees. The Vlookup function uses a *vertical* comparison table were a Hlookup function uses a *horizontal* grid.

Let's resume the last exercise of the =If function. A businessman gives a 5 % discount to customers who buy 5 of the same item or more. The discount is raised to 10 % if the customer buys 10 or more.

Using the =If function, the formula may look like this: **=If(B1>=10, b3\*0.1, if (B1>=5, b3\*0.05, 0))**. This formula is simple because it has only three possibilities (10 and above, between 5 and 10 and between 0 and 5). The formula becomes more difficult to create when you add more and more possibilities. The function =Vlookup or =Hlookup can help in this situation.

These functions need three parameters to work. The first one is the cell address that will be compared to a grid or a comparison table. It will be compared with the contents of the second parameter that will contain the address of the range of cells of a *comparison table*. The third parameter is to indicate the column (for =Vlookup) or the line (for =Hlookup) that will be shown from the comparison table.

=Vlookup(cell to compare, comparison table, index of the column) =Hlookup(cell to compare, comparison table, index of the line)

Before using the function, you must prepare a comparison table.

	A	В
11	0	0%
12	5	5%
13	10	10%

•Enter the following numbers in the appropriate cells, or in the A13 to B15 cells.

The first column of the comparison table is used to compare with a cell that contains a number. The numbers of that first column must always be in ascending order. You always put in the lowest possible number, or the floor, to reach this level. The "ceiling" is the "floor" of the next line of the comparison table. So, for the first line of the table, the minimal number is zero whereas the maximum is 5 exclusive or [0, 5[ for those that remember their mathematical operations. It's as for that reason that the numbers should always be in increasing order.

So, for the table in the **A11** to **B13** cells, the number 0 of the **A13** cell is the floor. The ceiling is the contents of the **A12** cell, or 5. So for all numbers between 0 and up but not including 5 ([0, 5[) will be on the first line of the table. It's infinitely close to 5 but it's not 5. All that's between 5 and infinitely close to 10 ([5, 10[) will be on the second line. For the numbers equal or superior to 10, it

will be the third line of the table. Because there are no other lines over the 10 of the **A13** cell, the "ceiling" is infinite.

The second, the third and the other columns usually contain the results that you want to show. For this table, the second column contains the discount rates according to the quantity that was bought.

■In the **B8** cell, enter the following formula: =**Vlookup(B1,A11:B13,2)\*B3**.

According to the quantity that entered the B1 cell, the =Vlookup function will compare this amount to its comparison table. When it will know the line to stop, it can then show the appropriate content from the chosen column. For example, if the number is 6,5, the =Vlookup function will stop at the second line of the table (between 5 and 10). It will then show the contents of the second column of this line witch is 5 %.

To help you to understand, here is another exercise with a grid for school grades. This exercise consists at showing the appropriate letter for a given note in the **B2** cell according to the grade located in the **B1** cell.

	A	В	С
1	Grade:	90	
2	Letter:	=VLOOKUP(B1,A5:B9,2)	
3	Comment:	=VLOOKUP(B1,A5:C9,3)	
4			
5	0	е	Fail
6	50	d	Poor
7	60	С	Good
8	75	b	Great
9	90	а	Excellent

Enter the text and the following numbers in the appropriate cells.

The **B1** cell will contain the number of the grade. The **B2** cell will contain the =Vlookup function that will compare the number in the **B1** cell and will show a letter that's the equivalent to the grade. The B3 cell will contain a =Vlookup function that will compare the grade with the comparison table and show the appropriate comment. The **A5** to **B9** cells contain the comparison table. The table indicates that the letter will be an " e " if you have a grade below 50. Between 50 and 60, the grade will be a " d ". Between 60 and 75, the grade will be a" c ". Between 75 and 85, the grade will be a" b ". And, for a grade of 85 or more, the grade will an " a ". For the =Vlookup function to work correctly, it needs three parameters: the cell address to compare (**B1**), the place of the comparison table ( A4:B8) and the column to be shown with the result (the second column or 2)

■In the **B2** cell, write the following formula: =Vlookup(B1,A4:B8,2).

	E	F	G	Н
1	Name	Grade	Letter	Comment
2	Adams, Robert	64	=VLOOKUP(F2,A\$5:B\$9,2)	
3	Hochkins, Thomas	49		
4	Jones, Emily	92		
5	Landry, Julian	74		
6	Smith, Judy	76		

You can also copy the formula into the **G3** to **G6** cells to find the grades noted in the **F3** to **F6** cells. Don't forget to "fix" the position of the comparison table by placing a "\$" in front of the lines in the formula. Or else the formula will not work. You'll learn more about <u>copying formulas and relative and absolute reference</u> on the next Chapter.

We will continue with something more difficult for the =Vlookup function. It consists in using the =Vlookup function with two variables. The first variable is identical to what you saw previously. The second variable consists of changing the comparison table column that in witch the function fetches the information to be shown.

	E	F	G	Н
1	Name	Grade	Letter	Comment
2	Adams, Robert	64	с	Good
3	Hochkins, Thomas	49	е	Fail
4	Jones, Emily	92	а	Excellent
5	Landry, Julian	74	с	Good
6	Smith, Judy	76	b	Great

Can you write the appropriate formula for the H2 cell? Write the formula that will show the comment in the H2 cell.

Up until now, you always wrote the number 2 for the third parameter of the =Vlookup function. The function always fetched the information to be shown in the second column of the comparison table. The next exercise consists in changing in the number in that column so that the =Vlookup function fetches the information to be shown according to the type of customer. That will be the second variable for this function. For this exercise, there are three categories of customers: type 1, 2 and 3. The function should look for the information to be shown in the second, third or fourth column of the table, depending on the type of customer + 1 because the first column of the table is used to compare the quantities bought in the comparison table to determine the quantity of the discount.

Write the following numbers in the appropriate cells.

	A	В	С	D				
15	Quantity	Client 1	Client 2	Client 3				
16	0	0%	0%	0%				
17	5	2.50%	5%	7.50%			D	E
18	10	7.50%	10%	12.50%	And	1	Client	1

You now have a new comparison table that takes into consideration the quantities bought and the type of client. The percentage of the discount will vary depending on the quantity and the type of client. The D1 cell is also important because it now defines the type of client being served.

In the B9 cell, write the following formula: =Vlookup(B1,A16:D18,E1+1).

Try the following combinations of numbers in **B1** and **D1** cells.

<b>B1</b>	<b>E1</b>	Result
4	1	0 %
7	1	2.5 %
7	2	5 %
7	3	7.5 %
10	3	12.5 %
-5	1	N/A
10	4	*REF!

All the numbers work except for the last two cases. In the first case, the amount bought is a negative quantity, this amount is smaller than the minimal threshold of the first line of the comparison table (0). So, this number does not apply to the comparison table.

For the last case, the function tries to look for information that's outside of the comparison table. The table consists of four columns. But, the =Vlookup function looks for information in the *Fifth Column*, there is no data there.

To make the =Vlookup or =Hlookup function even more powerful, it's also possible to use it to compare text. The first column of the comparison table can contain words instead of numbers. As for numbers, the list must be in ascending order. Contrary to numbers, the text should be exact. For example, the text can not be between Anjou and Avignon. Otherwise, you should expect the bizarre results as you'll see below.

	A	В
1	City	anjou
2	Occupation rate	=VLOOKUP(B1,A4:B7,2,1)
3		
4	Anjou	0.83
5	Bern	0.74
6	Brussels	0.97
7	Paris	0.99

Enter the text, the numbers and the following formulas in the appropriate cells.In the **B1** cell, enter **Avignon**.

The result will be 83 % in the **B2** cell. You should expect in bizarre results when you use text. Let's look at other possibilities.

Enter Tokyo in the B1 cell.

The result will be 99 %! Why? That's because it's listed after Paris. So, the function goes to the last line of the comparison table.

In the **B1** cell, enter **Boston**.

The result of the **B2** cell will be 74 % because it's between Bern and Brussels. So, although the function is very practical to compare numbers, it may not be as appropriate for text unless you use the fourth pamateter. The fourth parameter of this function is used to determine if the function sould look for an exact value to

compare or be between two values. By default or when the fourth paramater equals 1, the function is comparing between numbers. When its value is 0, the function will look for an exact match.

•In the **B2** cell, entrer the following formula: =VLOOKUP(B1,A4:B7,2,0)

The function will give you a "Not applicable" (#N/A) result because it's now looking for an exact value and not finding it. Boston is not in the comparason table.

Dr. RACHINI Ali – Microsoft Excel – Functions

# **Copy, Paste and references**

## Introduction

To effectively use a spreadsheet, you *must* be able to create formulas to calculate automatically any change that you could bring to your model. Because some of these formulas are alike, it's very effectient to copy them than to rewrite them. This page demonstrates how to copy formulas and also looks at the *very* important point of relative and absolute references. You *must* master these notions to properly use a spreadsheet.

## Сору

One of the big advantages of a spreadsheet is to be able to copy a formula or a text as often as you need to create a model. It's easier and faster to copy a formula than to rewrite it every time you need it. The usual way to copy a cell or a range of cells is as follows.

Select the cell or the range of cells to be copied.

From the Edit menu, select the Copy option.
 OR

Press the button.
OR
Press the Ctrl and C keys

Move the cursor in the cell you want to copy the content or make a range of cells where you want to copy the formula.

From the Edit menu, select the Paste option.
OR
Press the button.

OR Press the Ctrl and V keys.

Another technique to copy is to use the fill handle located in the lower right corner of the cell or a range of selected cells.



You need to:

Place the cursor in the cell to be copied.
Place the cursor on the small black square in the lower right corner of the cell.
Press the left mouse button and move the cursor to the right.

The contents of the cell are going to be copied into the selected cells. You can also copy the contents in any direction: left, right, up or down. You can also copy

a range of cells at the same time. The result will vary as the contents of cells are numbers or formulas. There is an exercise on this option later on this page.

## **Absolute and relative reference: IMPORTANT**

Coping formulas is the fastest way to create a model. There is however a trap that you must be aware. Let's place the following formula =A1+A2 in the **A3** cell. If you copy this formula in the **B3** and **C3** cells, the result would be the following: B3: =B1+B2, C3: =C1+C2. Why did Excel not copy exactly the formula =A1+A2?

Actually, it did copy the formula. It's all in the way that Excel interprets the formula. It's not the cell's address that's important but its position with regards to the cells where the formula is located. If the formula is in the **A3** cell, Excel will interpret the formula =A1+A2 this way: the **A1** cell is two cells above the current position of the formula and **A2** cell is just above. So, when Excel will copy the formula it's going to add both cells just above where the formula is placed. It's for that reason that the formulas copied in the **B3** (=B1+B2) and **C3** (=C1+C2) cells are this way. They also add the numbers of the two cells above the formula. This kind of reference in the formula is called *relative* reference. Everything is relative to the location of the formula. Excel always fetches the numbers in the same way. It's also more practical when you copy a formula. You usually use the same formula on a different set of numbers. For example, you can copy a formula that adds the monthly expenses. The same formula that was needed for January should also work for every other month of the year.

Quiz: If you copy the formula =A1+A2 from the **A3** cell to the **Z20** cell, what will the formula look like? The answer is at the <u>end of this page</u>.

But what can you do when you need a variable in the formula? A variable is information that can change at any time. For example, if you want to know what happens to the profits if the growth rate changes from 5 % to 50 %. Or what if the number of employees passes from 5 to 25? Or what if the mortgage rate to be renewed changes?

A model consists of three elements: **constants**, **variables** and **formulas**. Constants are number needed to start your model. They will not change during the timeline of your model. Even these numbers change in the long run, but not in the time frame for this model. Examples of constants are tax and insurance rates, sales tax, telephone bill and mortgage payments.

Variables are the data that you want to test the model by asking " what happens if... " questions. What will happen if the interest rates rise? What will happen if a customer doesn't pay? What will happen at such a growth rate? These variables can change at any time so that you can try to find the best solutions for your model.

Never write a variable in a formula. For example, never write =100000\*10%. Otherwise, you'll have to change every formula each time the variable changes. It's for that reason that you need to place a variable in a single cell. If the variable is written in several cells, chances are you are going to forget to change a value in one of these cells. This would invalidate your entire model because you forgot to change a single value. It also makes it very difficult to make sure that the model is correct because you must verify all the cells or where the variable is located. This would make the validation process, very long and very painful. So,

it's better to avoid copying a variable in several places in a file. The best way is to write a variable in a single cell and have every formula refer to that cell. Change the content of a single cell and your entire model changes! Isn't it why you created a model in the first place?

This makes the work of creating formulas a little more complicated. What must you do when you want to copy a formula? Cell addresses are composed of two components: a reference to the column and to line they're located. The first cell's address, A1, is composed of these two components. The letter represents the column and the number represents the line. The column's addresses are from A to Z and then from AA to IV (in Excel 2007 it goes up to XFD). The line's addresses are from 1 to 65 565 (compared to Excel 2007's 1 048 576).

By copying a formula, the relative reference changes too. The column reference changes when you copy a formula horizontaly (left to right). The line reference changes when you copy a formula verticaly (up and down).

You can use the dollar sign (\$) to "fix" or "freeze" a column or a line in a formula. When the formula will be copied, the parts that are frozen will not change. To freeze, you must place the dollar sign (\$) in front of the column or line position.

A1	Neither the column nor the line is frozen.	Exampl
\$A1	The column is frozen but not the line.	e:
A\$1	The line is frozen but not the column.	Write
\$A\$1	The line and the column are frozen.	number s and
followin	ng formula in the appropriate cells.	e and

**A1**: 100 , **A2**: 200 , **A3**: =\$A1+A2

Copy the contents of the **A3** cell in the **B3** to **E3** cells. There are many ways to copy the formula. Here are two of them

Place the cursor in the A3 cell.

From the Edit menu, select the Copy option.
Make a range with the B3 to E3 cells.
From the Edit menu, select the Paste option

There is also the other way by using the fill handle.

Place the cursor in the A3 cell.

Place the cursor on the lower right corner of the cell, on the black square in the corner. The shape of the cursor should change to a black "+" sign.
Keep your finger on the left mouse button and move the cursor up to the E3 cell.

The other ways would have been to use the **CTRL+C** and **CTRL+V** keys to copy and paste the cell. You could also have used the copy and paste buttons on the standard toolbar or use the copy and paste options from the context menu that's available by pressing the right mouse button.

The formulas in the **B3** to **E3** cells are:

#### **Cell Result Formula**

B3 100 =\$A1+B2

C3 100 =\$A1+C2 D3 100 =\$A1+D2 E3 100 =\$A1+E2

By "freezing" the A column in the formula, this reference will always look for the value in the first column (A). This is necessary when you want to look for the contents of a cell that contains a variable and you wish to copy the formula. A formula that has a relative position would not allow you to look for the contents of the **A1** cell once it's copied elsewhere. By freezing the column or the line in the formula, you'll not be obliged to change the formula once you copied it to other cells.

If you want to copy a formula horizontally, you may only need to freeze the column reference (\$A1). If you wish to copy a formula vertically, you may need to freeze the row or line reference (A\$1). If you a coping the formula to a different row and column, you may need to freeze both. It depends on where the data is located relative to the position of your formula. If they're always in the same cell, you need to freeze the column of line to get an absolute reference. Excel will always look for the data in the same column or line.

#### Exercise with the exchange rate

This exercise is to demonstrate the enormous advantage of using relative and absolute references in formulas that you want to copy. It consists in changing the values of US currency into Canadian dollars.

	A	В	С	D
1	5	10	15	20
2	1,4			
3	=A1*A2			
4				

Write numbers and formulas in the appropriate cells.

For this exercise, we presume that 1 US dollar equals 1.4 Canadian dollars, which is a the rate in the **A2** cell. The **A3** cell contains the formula that will help us to find the value for the first column. The result of this cell should be 7 (5 \* 1.4 = 7). You could write the formula again for the following cells, from **B3** to **D3**, but it's even more effective to copy the formula to the other cells (**B3** to **D3**).

Place the cursor in the A3 cell.
From the Edit menu, select the Copy option.
OR
Press the button.
OR
Press the CTRL and C keys.

The frame around the **A3** cell will flash. This is normal. It's to remind you that it's the cell that you have just copied.

Make a range with the B3 to D3 cells.
From the Edit menu, select the Paste option.
OR



And here it is! The formula is now copied in the other cells that you have just specified. However, the result is not what you expected. There are only zeros instead of values! Let's find out why.

•Place the cursor in the **B3** cell.

You can see from the formula bar the following contents:

B3	-	<b>=</b> =B1*B2
----	---	-----------------

You'll notice that the **B1** cell contains a value (10) whereas the **B2** cell is empty. It's for that reason that Excel shows the value 0 (10 \* 0 = 0) in the **B3** cell.

To solve this small problem, you could copy the exchange rate of the **A2** cell in the **B2** to **D2** cells. But that's not a practical solution for several reasons. In the first place, the same value would occupy several cells for nothing. You could put the other numbers or formulas in that place. Secondly, the chances to forget to change the contents of a single cell during modifications are far too high. It would be really pity to have a useless model because you forgot to change the contents of one or two cells!

It's preferable to put the values of variables and constants in cells apart and adjust formulas. It's never a good idea to put the value of a constant or a variable in a formula. As mentioned in the previous paragraph, if you forget to change the value in a single cell, invalidates your model.

In fact constants and variables have something common: they can change. A variable can change any time for the needs of your model: occupation rate, price of a product, price of the material etc. A constant can also change but on a mid to long-term basis: taxes, tax rates, interest rates... Because a variable or constant can change, it's much easier to manage it by placing the value in a single cell. You can adjust your formulas to refer to that cell using relative and absolute references. You must master theses references if you wish to copy formulas and efficiently use Excel or any other spreadsheet.

Let's return to the exercise. The formula must be adjusted so that it can always find the exchange rate in the right cell; **A2** in our case. But what must you know before adjusting the formula?

Is there a part of the formula that you want to fix or freeze? For the exercise, it's necessary to "fix" the **A2** part of the formula.

You must know if you will copy the formula horizontally, vertically or both? For the exercise, the formula will be copied horizontally in the **B3** to **D3** cells. Because it's horizontally, you only need "freeze" or to "fix" the letter of the column and not the number of the line in the cell address contained in the formula.

It's now time to change the formula of the **A3** cell to adapt it.

•Place the cursor in the A3 cell.

To change the contents of the cell.

Press the F2 key.
OR
Double-click the A3 cell.
OR
Place then the cursor on the formula bar.

Change the contents of the formula to this: =A1\*\$A2

The formula was changed but the value remains the same: 7 (5 \* 1,4). It's only when you'll copy the formula and see the results that you'll notice the change.

•Copy the formula in the A3 cell into the B3 to D3 cells.

If you need a reminder, refer to the instructions for copying above.

	A	В	С	D
1	5	10	15	20
2	1,4			
3	7	14	21	28

•Verify the formulas of in the **B3** to **D3** cells.

**B3**: =B1\*\$A2 **C3**: =C1\*\$A2 **D3**: =D1\*\$A2

You have now the right result because you "froze" the A column of the **A2** cell. Look how it's practical:

Change the value of the A2 cell from 1.4 to 1.25.

	A	В	С	D
1	5	10	15	20
2	1,25			
3	6,25	12,5	18,75	25

All the values in worksheet have been changed by changing the content of a single cell! What do you prefer now; change the contents of a single cell or change several cells? Which one is the most efficient? (Answer: change a single cell)

But it's necessary to pay attention in the way that one uses the relative and absolute references.

Place the cursor in the A3 cell.
Copy the contents of the cell.
Paste it in the A4 to A8 cells.

## Dr. RACHINI Ali – Microsoft Excel – Copy, Paste and references

	A	В	С	D
1	5	10	15	20
2	1,25			
3	6,25	12,5	18,75	25
4	7,8125			
5	48,828125			
6	381,4697266			
7	18626,45149			
8	7105427,358			

What exchange rate! Let's verify the contents of the A4 to A8 cells.

A4: = A2\*\$A3 A5: =A3\*\$A4 A6: =A4\*\$A5 A7: =A5\*\$A6 A8: =A6\*\$A7

You see the problem! The formula was copied vertically and not horizontally. Although the column is frozen, the lines are not. It's for that reason that the results climb so quickly. Be careful when you apply relative and absolute references. Be sure to freeze the right column or line.

#### Please.

Take as much practice as you can with this technique. It's *essential* to effectively use Excel. Build your own exercises!

The answer to the relative question about copying the formula =a1+a2 from the A3 cell to the Z20 cell is: =Z18+Z19. It adds the content of the two cells just above the formula, wherever it's located in the worksheet.

# **Charts (Graphs)**

## Introduction

Why use a chart?

- To simplify the analysis of a mass of data.
- To be able to compare the data.
- To quickly analyze the trends in data series.
- To analyze proportions among different data series.

## **Create a chart**

This exercise consists in creating a "3D Column chart" on a new worksheet.

Enter the following data in the appropriate cells.

	A	В	С	D	
1		2005	2006	2007	
2	Other	15	20	25	
3	Carpets	25	30	35	
4	Furniture	30	35	40	

Select the data by using a block (continuous or non-continuous), for the exercise, from **A1** to **D4**.

The data selection is very important. Avoid selecting empty lines or columns. They will be added to the chart and leave empty spots in your chart. Use the instructions in the <u>Basic operations page</u> to select only the <u>blocks of cells</u> that you need. Make sure that every range of cells selected represents at least a data series for the chart. Don't take single cells scattered everywhere on your worksheet.

Generally, the first line or row selected from the range of cells will be used by the chart for the description of the X axis. The content of the first column from the range of cells will be used as the description for the legend of the chart. But, Excel will be confused if the description that you need for the X axis are numbers.

From the Insert menu, select the Chart option.
OR

Use Excel's chart assistant by pressing the <sup>11</sup>/<sub>10</sub> button.
 Answer the questions that you will be shown in the next windows.

## Dr. RACHINI Ali – Microsoft Excel – Charts

Chart Wizard -	Step 1 of 4 -	Chart Type 🛛 🛛 🔀
Standard Types	Custom Types	]
Chart type: Chart type: Bar Column E Bar Column Pie Pie XY (Scatter) Area Oughnut Radar Surface Bubble		Chart sub-type:
		Press and Hold to View Sample
(	Cancel	< Back Next > Einish

The first stage consists in choosing a chart from the 14 categories that are represented in the left column. In the right part of the screen, there are subcategories to represent the same data in a different ways.

These subcategories are alike, but will give a different representation from the same data. The first line shows the data in two dimensions (2D). The second line shows these same data but in three dimensions (3D). Furthermore, the first column shows the data series the one next to another. The second column shows the data series in cumulative mode (one on top of the other). The last column shows the proportion of each of the series. Notice that each of the bars is of the same height, only the proportion of each series changes.

Before continuing, it's possible to have a preview of the chart to make sure to have chosen the right type of chart to better to represent the data. Press the button "**Press and Hold to View Sample**" to have a preview of the chart. The section with the subcategories of chart will be replaced by a representation of the chart. You can try different types of charts before going any further and preview them.

Make you have the right selection. For the exercise, select from the Column charts, the 3-D Column option.
 Press the Next button.

For the second step to create a chart has two tabs: the one to determine the range of data (Data range) and the other to look of the data series.

# Dr. RACHINI Ali – Microsoft Excel – Charts

Chart Wizard	i - Step 2 of 4 - Chart Source Data	? 🔀
Data Range	Series	
	40 40 40 40 40 40 40 40 40 40	Other Carpets Furniture
<u>D</u> ata range: Series in:	<mark>=Sheet1!\$A\$1:\$D\$4</mark> <ul> <li>● <u>R</u>ows</li> <li>● Columns</li> </ul>	
	Cancel < <u>B</u> ack <u>N</u> ext >	<u>Einish</u>

The **Data range** tab is there to make sure that you chose the right area of cells as the data series of your chart. If there is an error, you can always press the button at the end of the box to re-select the cells you need for the chart. You can determine that the data series are in columns or in lines. This means that every line or every column represent a data series on an item that you want to represent in the chart. For the purpose of this exercise, make sure that the data series are in rows and not in columns. That means that every row from the range of cells you selected will be a data series.

You also have a preview of the final chart before having finished it! You can experiment and see that will be the final result by changing the representation of the data series.

•Click on the **Series** tab.

Chart Wizard - Step 2	of 4 - Chart	Source Data	? 🗙
Data Range Series			
40 35 30 25 20 15 10 5 0 2005		Dother Carpets Other	ets une
Series	Name:	=Sheet1!\$A\$2	
Carpets Furniture	<u> </u>		
	<u>V</u> alues:	=Sheet1!\$B\$2:\$D\$2	<b>N</b>
Add Remove			
Ca <u>t</u> egory (X) axis labels:	=Sh	eet1!\$B\$1:\$D\$1	<b></b>
Cancel < <u>B</u> ack <u>N</u> ext > <u>F</u> inish			

Under the Series tab, it's possible to change, add or delete data series. In the bottom to the left of the window, you have the name of each of the series. In the right-hand side, the "Name" box allows you to change the name of a series. It's that name that will appear in the legend of the chart. You can select the content of a cell of one of the worksheets of the file or you can write the text of your choice.

The "Values" box is an area of cells that contain the numbers you want to see in the chart for that data series. You can change the area at any time.

The "Category (X) axis labels" box indicates the description that will be shown on the X axis of the chart. It's still possible to you to change it. You just need to press the button at the end of the box and select the cells that you wish for the X axis. You can also write the content. You need to place a semi-colon (;) between the text For example, orders could come from "In store"; "Catalogue"; "Internet".

•Make your selection and press the **Next** button.

For the third step, there are several tabs. Each describes a characteristic of the chart.

•Click on the **Titles** tab.

Chart Wizard - Step 3 of 4 -	Chart Options 🛛 🛛 🔀		
Titles Axes Gridlines	Legend Data Labels Data Table		
Chart <u>title:</u> Revenus by category Revenus by category			
Category (X) axis: Years			
Series (Y) axis:	(M\$) 20 15 10 10 10 10 10 10 10 10 10 10		
Value (Z) axis: (M\$)	Other Categori Furniture		
	Years		
Cancel Cancel <u>Rext &gt;</u>			

The tab of the titles serves for writing the text that will appear to the main title of the chart as well as for the descriptions of each of the axes of the chart. For this exercise:

- In the Chart title box, write: Revenues by Categories.
  In the Category (X) axis box, write: Years.
  In the Series (Y) axis box, write: Categories.
- In the Value (Z) axis box, write (M\$).

Click on the **Axes** tab.

Chart Wizard - Step 3 of 4 - Ch Titles Axes Gridlines Lea Primary axis Category (X) axis Automatic Category Time-scale Series (Y) axis Value (Z) axis	art Options gend Data Labels Data Table	The Axes tab gives you the choice to show or to hide the data of the various axes of the chart. For the moment, leave all axis visible.
Car	ncel < <u>B</u> ack <u>N</u> ext > <u>F</u> ir	ish

# Dr. RACHINI Ali – Microsoft Excel – Charts

Click on the **Gridlines** tab.

Chart Wizard - Step 3 of 4 - C	Chart Options 🛛 🔹 🔀		
Titles Axes Gridlines I	Legend Data Labels Data Table		
Major gridlines Minor gridlines Series (Y) axis Major gridlines Minor gridlines Value (Z) axis Major gridlines Major gridlines O Major gridlines 2-D walls and gridlines	Revenus by category		
Cancel < <u>B</u> ack <u>N</u> ext > <u>F</u> inish			

Gridlines help you compare items that are not close to each other. You compare them to the gridlines to see a trend upward or downward. Under this tab, it's possible to show or hide the gridlines of the chart. For the purpose of this exercise, select the same options as the image; just activate the major gridlines for each axis.

•Click on the **Legend** tab.

Chart Wizard - Step 3 of 4 - Chart Options 🔹 🥐 🔀						
Titles  Show  Placemen  Bott  Corr  Corr  Eigh  Eigh  Left	Axes legend t om her t	Gridlines	Legend (M	Data Labels Reve 40 35 30 25 15 10 2005	Data Table	rg urniture Categorie s
Cancel < <u>B</u> ack <u>N</u> ext > <u>F</u> inish						

This tab allows you to show or not the legend of the chart. It contains the names of each series of your chart with a color representation beside it. There, more you

can decide on the position of the legend.

•Select the **Bottom** position.

•Click on the Data Labels tab.



Under this tab, it's possible to you to show labels and values of each of the elements of the series. You can show the value, the percentage, both or even the description of the X axis (series name). The big problem with this option is that it crowds the chart with too much information making it more difficult to read. One option is to activate the label you want but move them on the side of the bar instead of over the top of each bar. It gives more information without blocking the view on the trends or the proportions of the chart.

•For this exercise, do not activate any options.
•Click on the **Data Labels** tab.

Chart Wi	zard - Ste	ep 3 of 4	- Cha	art Option	s		?	
Titles	Axes	Gridlines	Leg	end Data	Labels	Data Table		
Show	Show data table  Show leagend keys							
		-		(M1				
				(	, <u>1</u>	Other	Categorie	
					õ Years	500	s	
				Г	2005	2006	2007	
				Other	15	20	25	
				Carpets	25	30	35	
				·	30	35	40	
					Other I	🛚 Carpets🗆 Furnit	ure	
			-					
Cancel < <u>B</u> ack <u>N</u> ext > <u>E</u> inish								

This is a recent addition to Excel. It's possible not only to show a chart but also the numbers themselves in a table below the chart. Select the **Show the data table** option to have a preview of the result. However, for the needs of the exercise, don't show the data table. It will be shown how to show this table, and how to personalize the chart farther on this page.

For this exercise, do not activate the Data table.Press the **Next** button.

Chart Wizard - Step 4 of 4 - Chart Location				
Place chart: -				
	⊙ As new <u>s</u> heet:	Chart1		
	O As object in:	Sheet1	~	
	Cancel	   	Finish	

The chart assistant will ask you a last question. Do you want this chart in a worksheet that has numbers or on a new chart sheet? You can also give a name to this new working sheet.

•For this exercise, select a new chart sheet that will be called **Chart1**.

Press the Finish button.

Excel will show you the finished chart with the options you selected.



## **Personalize the chart**

Even if you finished the chart, it's always possible to personalize it better to answer your needs. The next part consists in showing to you some of its options and how to apply them.

The first stage consists in widening the space that's assigned to the chart.

Click on the chart only to select the part that's reserved for the chart.
Select one of the squares dimension square on the border of the chart.
Press the **left** mouse button and move the dimension square to the outside of the zone reserved for the chart.

You can, by selecting an object, that it's the chart, the title, the legend or quite other object that meets itself in the zone of chart, to move it or to change it.



The chart changed dimensions. But, the text that meets itself on axes is still too big for the rest of the chart. To change the size of the text, there are three ways.

Place the cursor on the X axis of the chart.
Double-click on the axis.
OR
Click on the X axis.
From the Format menu, select the first option; OR

Chart		-	×
Category Axis	🔹 📽   🖄 🕶   🗄 🏢	38	¢6

From the chart toolbar, select the Category axis from the list on controls on the chart.

•Press on the **Properties** button

The window with the properties of the axis will appear

Format Axis	$\mathbf{X}$			
Patterns Scale Font	Number Alignment			
Eont: Arial	F <u>o</u> nt style: <u>S</u> ize: Regular 10			
Albertus Medium Tr Algerian Antique Olive Tr Arial	Regular   8     Italic   9     Bold   10     Bold Italic   11			
Underline:	Color: Background:			
None 🗸 🗸	Automatic 💙 Automatic 🗸 🗸			
Effects Strikethrough Superscript Subscript	Preview AaBbCcYyZz			
Auto scale This is a TrueType font. The same font will be used on both your printer and your screen.				
	OK Cancel			

Change the size of the text to **10 points**.
 Repeat the operation for the "Y" and "Z" axis.

It may be necessary to enlarge the size of the font for the title of the chart.

Double-click on the title of the chart.Select all the text of the title.Change the size of the text.

The result should look like the image below.



This looks like a chart that you can put in a report or a document for a customer or even to your boss. But you can even better. Excel offers several other options to improve the presentation of a chart.

# **Changing options**

To change an option of one of the objects in the chart, you can click on it and choose from the Format menu the first option. You can also double-click on the object that you want to change. Another way is to click the object and to press Properties button on the Chart toolbar. Another option you can use is by placing the cursor over the object and pressing on the **right** mouse button. A list of the options most often used will appear. It is also called a context menu.

Here is the short list of what you can make to change in the chart: move objects, change their size, the color and the orientation of the text, change the color, the pattern and the order of the series, insert some free text, drawings, arrows, the square or any item from the Draw toolbar, etc. You can access all the options by using the mouse or the main menu.

To stop changing options of the chart, click outside of the frame of the chart. If you generated your chart on another worksheet, click the tab to another worksheet.

## Change the legend's text

It's also possible for you to change the text that's in the legend. Here is the legend before the change.

From the Chart menu, select the Source data option.Click on the Data Range tab.

Source Data	? 🗙
Data Range Series	
(M\$) 2005 2006 2007 2005 2006 2007 Ye Other Carpets Furniture	
Data range: =Sheet1!\$A\$1:\$D\$4	
Series in: <u>• R</u> ows O Columns	
ОК	Cancel

Under this tab, you can change the area of the data and change the data series of lines in columns or vice versa.

### •Click on the **Series** tab.

Source Data	? 🗙
Data Range Series	
(M\$) 2005 2006 2007 Y Small items Carpets Furniture	gories
Series Small items Name: Small items Carpets Furniture	<b>.</b>
Values:     =Sheet1!\$B\$2:\$D\$2       Add     Remove	<b>.</b>
Category (X) axis labels: =Sheet1!\$B\$1:\$D\$1	3
ОК	Cancel

Under this tab, you can add or remove data series to the chart. It's also possible to change the name of a data series that appears in the legend, to change the range where the values are located and the description for the X axis of the chart. This exercise consists in changing the name that seems to the legend for the series "Other".

•From the Series section, select the Other option .

The data about the series will appear in the boxes to the right of the window.

Click in the Name box.

You can write of the text or write the name of the cell that will be the description of the legend.

Write Small items.Press the OK button.

Here is the legend after the change.

Small items Carpets Furniture

## Change the legend's placement or position

There are three ways to change the place: by using an option of the format menu or the properties of the chart or manually by using the mouse.

Click on the legend.
From the Format menu, select the first option: selected legend.
OR
From the Chart toolbar, select the object Legend of the list.

From the Chart toolbar, select the object Legend of the lis
 Press the button of the properties.

Click on the **Position** tab.Select the new location for the legend in the chart.

You can also move the legend by using the mouse.

Click on the legend

Place the cursor inside the legend box.

Press the left mouse button and move the box down to the bottom of the chart.

You can later change the size of the chart to take advantage of the space freed by the legend.

Click on the chart.

A border with squares should appear around the chart. Otherwise, re-select.

Place the cursor on the square of the middle right border of the chart.
Press the left mouse button and move the square to the right-hand side of the screen.

Release the mouse button.

You can so in this way by using the other squares to change the size of the chart.

## Change the size, the color and the orientation of the text

It's possible to change these options for all the boxes of text including the one on the axes.

Click on the main title.
From the Format menu, select the first option: selected title.
OR
Double-click on the main title.

Select the Font tab.Change the options of size and color in your choice.

The next example consists in changing the orientation of the text of one of axes...

Double-click on one of the axes.

OR

Click one of the axes of the chart.

From the Format menu, select the first option: selected axis.

Click on the **Position** tab.
Change the vertical orientation of the text.
Press the **OK** button.

## Change the color and the shade of bars

To highlight a data series, it's possible to change its color as well as its pattern. Furthermore, if you think of printing on a printer, you may need to change the pattern for each of the series. Otherwise, the bars of the chart are all going to look the same. For example, a data series of the red color will be printed with the same tone of grey as the one that's blue. Both are going to be printed grey on a piece of paper. It may be better to distinguishing different data series to have a different pattern for each.

Click on one of the data series.

From the Format menu, select the first option: Selected Data Series.
 Click on the Patterns tab.

Format Data Series	<b>X</b>
Format Data Series         Patterns       Shape       Data Labels         Border <ul> <li>Automatic</li> <li>None</li> <li>Custom</li> <li>Style:</li> <li>Color:</li> <li>Automatic</li> <li>Weight:</li> <li>Sample</li> </ul> <li>Sample</li>	Series Order Options

•Press the **Fill Effects** button.

Fill Effects		X
Gradient Texture Patte	ern Picture Color <u>1</u> :	OK Cancel
<ul> <li>Two colors</li> <li>Preset</li> </ul>	Color <u>2</u> :	
From:	> 0%	
Shading styles	Variants	
<ul> <li>Vertical</li> <li>Diagonal up</li> <li>Diagonal down</li> <li>Erom corner</li> <li>From center</li> </ul>		Sample:

There are many ways to change the pattern on the bars of a Data series. Excel regroups them under four tabs: Gradient, Texture, Pattern and Picture. The Gradient tab able you to place gradient progressive patterns on the bars. The Texture tabs able you to place "natural" pattern from marble, wood and fabrics. The Pattern tab offers different types of stripes, lines and other regular patterns. The Picture tab offers you the possibility to apply an image of your choice inside the Data series bar. Look at all the options and select the one that you need.

Change the color and the pattern for the Data series.Select the Shape tab.

Format D	ata Series				
Patterns	Shape	Data Labels	Series Order	Options	
See an					
	alump chapa				
	.olumn <u>s</u> nape	2	2		
	Ŕ	۲. ۲	۸ آ		
	(A)	A		>	
	<sup>4</sup> ⊂	5	6 A		and the second second second second
	d J			>	
	U~	$ $ $\square$	0		
				ОК	Cancel

Not only can you change the patterns on the bars of the chart, you can also change the forms. You can choose from regular boxes to pyramids, cylinders and cones. Please take note that the only fill effects available for cylinders and cones are patterns, no gradient, texture or images for them.

Select the Pyramid type.Press the **OK** button.



## Change the series' order

From time to time, a data series is hidden by the others. Or you may wish to move a data series ahead of another. It's possible for you to change the order of the data series to avoid this situation.

Click on the series that you want to change the place in the chart.
From the Format menu, select the first option Selected Data Series.
Click on the Series order tab.

Format Data Series	$\mathbf{X}$
Patterns Shape Data Labels Series Order Options	_
Series order:  Furniture Carpets Small items Move Down	
Revenus by category         40       40         40       40         40       40         40       40         40       40         40       40         40       40         40       40         40       40         40       40         40       40         40       40         40       40         40       40         40       40         40       40         40       40         40       50         50       2005         2005       2006         2005       2006         2005       2006         2005       2007         Furniture III Carpets III Small items	
OK Cancel	

Select the series of your choice from the left column.
 Press the "Move up" or "Move down" button according to your choice.
 Once finished, press the OK button.

The more the data series is up on the list, the more toward the front of the chart it will be. Here is the result according to the order of the previous image.



Replace the series in its original location in the chart.

### The data labels

You can show the value of the bar or the description of the axis of the various data series.

Click on the first data series.

From the menu Format, select the first option: selected data series.Click on the Data labels tab.

Press the radio button next to the Show value option.

Press the **OK** button.



The values that represent bars are going to appear above these. You can then move them towards your choice. This option shows you the values of a series at the same moment. It's possible to show the labels of all the series.

From the Chart menu, select the Chart Options option.
Select the Data labels tab.
Select the Show values option.
Press the OK button.

The values of the series appear above bars. You can move them afterward and change their format.

Remove all labels.

### **Insert an images**

It's also possible to add images such as the company logo or another image suited for the chart.

### •From the **Insert** menu, select the **Image** option.

Excel offers you several sources for the image. It can be from Office's library, the Internet, a file that you have or a WordArt text image.

Select the From a file option.
Select the right drive (Hard disk, CD, diskette ...) and the right folder.
Click on the name of the file.
Press the OK button.

#### To move the image.

Place the cursor inside the image.
Press the left mouse button, keep pressing it and move the image in its new location.

#### To change the size of the image.

Click on the image.

A border with squares will appear around the image.

Place the cursor on one of the square of your choice.
Press the left mouse button and move the square to enlarge or reduce the size of the image.

To keep the image size proportional, also keep a finger on the **Shift** key.

## **Insert free text**

Apart from the main title and the axes titles, it's also possible to add text to the chart to add comments.

🗙 🗸 🏂 Spectacular increase!

Click on the formula toolbar.

Write Spectacular increase! and press the Enter key or the button with the green checkmark.

The text will appear in the chart. To move the text box.

Place the cursor inside the text box.

Press the left mouse button and move the text box in the right-hand side of the chart.



You can then change the format of the text such as its size, its color and its orientation. Simply select the text and to choose the first option from the **Format** menu or double-click on the text.

### **Insert** an arrow

Not only can you add text but also any object from the Draw toolbar. The next exercise consists in adding an arrow to the chart to better explain a point. It's also possible to add square, circles and several other objects. Before, continuing the Draw toolbar must be activated.

From the View menu, select the Toolbars.Activate the Drawing toolbar by placing.

### To move the Drawing toolbar.

Place the cursor on the titles bar of the toolbar.
Press the left mouse button, keep pressing it and move the bar completely to the bottom of the screen.
Release the mouse button.

#### To insert an arrow.

Click on the button arrows.
Place the just cursor below the text "Spectacular increase!"
Press the left mouse button and move the cursor up to the third bar of the first data series.
Release the mouse button.



### Add a series of numbers

Your are now asked to add a data series that includes the exports of the company.

Add this last data series of numbers to your model.

	A	В	С	D
1		2005	2006	2007
2	Other	15	20	25
3	Carpets	25	30	35
4	Furniture	30	35	40
5	Exports	5	10	20

In fact, it would have been able to place these data wherever on the worksheet. It's only the most logical place to place them. There are two ways to insert them: by using the options of for chart or simply to "drag" the range over the chart. The next part consists in adding a data series by using the options for charts.

Click on the chart.
From the Chart menu, select the Source Data option.
Click on the Series tab.
Press the Add button.

You'll have to enter some data in the Name and Values boxes so that the new Data series shows up on the chart.

Source Data			? 🗙
Data Range Series			
(M\$) 20 15 2005 10 2005 10 2005 10 2005	2006 2007 ms Carpets	Exports Furniture Carpets Small items Categories Furniture Exports	
Small items Carpets Furniture	<u>N</u> ame: [	=Sheet1!\$A\$5	
Add <u>R</u> emove	<u>V</u> alues:	=Sheet1!\$B\$5:\$D\$5	•
Ca <u>t</u> egory (X) axis labels:	=She	et1!\$B\$1:\$D\$1	<b>.</b>
		ОКС	ancel

Click in the Name box.
Write in the Exports box.
OR

Press the button at the end of the box.
Select the cell containing the text **Exports**.
Press the button at the end of the window.

•Click in the **Values** box.

Press the button at the end of the box.
( 5 , 10 , 20) select the data series for the exports (B5 to D5).
Press the button at the end of the window.

Because labels for the X axis are the same than for the previous series, you don't need to change the data.

Press the **OK** button.

Exports Furniture Carpets Small items

A new data series was added to the chart. This series is however in the back of the chart. It's hidden by all the others. You can <u>change the order of</u> <u>presentation of the series</u> that was explained earlier on this page.

The other way of adding a data series to the chart is to select the range of values and the title (**A5** to **D5**) and to slide it over the chart. However, this option works only if the data and the chart are on the same worksheet. This is impossible for the exercise of this page. The procedure is very simple.

Select the area of data including the title.

Press the left mouse button and move the selection over the chart.

Once over the chart, the cursor should change and show a "+" sign next to the cursor.

Release the mouse button.

The selected series will appear on the chart.

### Insert a second Y axis

Excel makes possible the addition of a second Y axis on the right-hand side of the chart. This allows you to compare values of different proportions. For example, it would be very difficult to compare millions of units sold to the percentage of market shares. This option is only available for charts with two dimensions (2D). Before demonstrating you this option, it will so be necessary to change type of chart.

Remove the "Spectacular increase" text and the arrow.

Chart Type	? 🛛
Standard Types Custom Types	]
Chart type:	Chart sub-type:
Column Column Bar Bar Line Pie XY (Scatter) Area Doughnut Radar Surface Bubble V	
Options Apply to selection Default formatting	Clustered Column. Compares values across categories. Press and Hold to <u>V</u> iew Sample
Set as default chart	OK Cancel

•From the **Chart** menu, select the **Type of chart** option.

Select the type of chart according to the image above.Press the **OK** button.



For this exercise, we are going to presume that the data series **Exports** needs to be on a second axis.

Select the series **Exports** by clicking one of the bars of the series.

### Be careful!

All the bars of the series should be selected. Otherwise, click somewhere else the chart and select once again the **Exports** series.

•From the Format menu, select the option Selected Data Series.

OR

Double-click on the series.

OR

•From the chart toolbar, select the item Series "Exports".

•Press then on the 🖻 button.

Select the Selected Data Series tab.

Format Da	ata Series					
Patterns	Axis	Y Error Bars	Data Labels	Series Order	Options	
Plot serie: Prima Secor	s on ry axis idary axis					
50 - 40 - 20 - 10 - 0 - Y	/////////////////////////////////////	Revenus by ca 200 all items Carpets	ategory 6 2 Furniture 🗆 Expo	20 15 10 5 007		
				ОК		ancel

#### Activate the Secondary Axis option.

Excel offers you a preview of the chart. You can change this option or the others concerning the data series.



#### •Press the **OK** button.

The **Export** data series is now visible beside the other date series of the chart. It has its own Y axis on the right-hand side of the chart.

To be able to better compare the data series **Exports** of the others, it would be preferable to change the type of chart for it. It will be changed the type of **Line** chart.

Chart Type	? 🛛
Standard Types Custom Types	5
Chart type: Column Bar Line Pie XY (Scatter) Area Doughnut Radar Surface Bubble	Chart sub-type:
Options Apply to selection	Line with markers displayed at each data value.
	Press and Hold to <u>V</u> iew Sample
S <u>e</u> t as default chart	OK Cancel

Select the **Exports** series with one of the techniques mentioned above.

Select the type of chart for only this Data series by selecting a Line with markers for the type of chart.
 Press the OK button.



Here is the chart under its final format. It's now easier to distinguish the series and to compare them. There was also another way of changing the type of chart for one or all the data series. But you can't mix 2D with 3D charts or some types of chart with others.

Select the data series or the chart in its entirety according to your needs.



•From the **Chart toolbar**, select the type of chart of your choice.

There are some types of predefined charts having two axes.

From the Chart menu, select the Type of chart option.Select the Custom Types tab.

Chart Type	? 🛛
Standard Types       Custom Types         Chart type: <ul> <li>B&amp;W Pie</li> <li>Blue Pie</li> <li>Colored Lines</li> <li>Column - Area</li> <li>Columns with Depth</li> <li>Cones</li> <li>Floating Bars</li> <li>Line - Column on 2 Axes</li> <li>Lines on 2 Axes</li> <li>Select from</li> <li>User-defined</li> <li>Built-in</li> </ul> <li>Standard Types</li>	Sample: 5 5 5 5 5 5 5 5 5 5 5 5 5
Set as default chart	OK Cancel

Of the list of the types of charts, there are two that have two axes: Line - Column on 2 axes and Lines on 2 Axes.

•Press the **Cancel** button.

## "Explode" a part of a pie chart

The "Pie" charts are mostly used to demonstrate proportions or shares. But you may wish to highlight a point of the pie to put it more interest on it. Before being able to "explode" a point, it's necessary to create a pie chart.

Enter the following data in a worksheet.

	A
1	1
2	2
3	3

Make a block with the range of data.

Press the chart button .
From the list of chart types, select Pie.
Select the Pie with a 3-D visual effect option (second option).
Press the Next button twice.
Press the Legend tab.
Unselect the View the legend option.
Press the End button.

The "**3-D Pie chart**" will appear in the frame that you created. Otherwise, begin again the steps above.



It's as easy as pie to split a pie chart! Sorry! I couldn't resist the pun.

## **Print only a chart**

It's always possible to you to print the chart alone on a page even if it's next to numbers and to formulas.

Click on the chart you wish to print.

All the options of the menus are going to fit to give the possibilities of the chart; including the printing. If you don't click the chart, the page setup and printing are going to show you the chart and the numbers of the worksheet instead of only the chart.

To have a print preview of your chart, press the button.
OR

•From the **<u>F</u>ile** menu, select the **Print Preview** option.

You can use the same page setup and printing options as you set for the printing of the worksheets. Make sure to always preview before the printing. If you want to print just the chart, trust the preview of the chart. Although the chart seems correct with your data, it's the print preview that gives the best representation on to paper.

•Press the **Setup** button.

They are the options of pagination for the chart. They are almost identical to those for the pagination for the file with the exception of the last tab: chart.

Click on the **Chart** tab.

The chart size option allows you to determine the size that it will take on paper. The "Use full page" option ajust the chart to take advantage of the whole page. The option "Scale to fit page" takes just advantage of the width of the page. The "Custom" option keeps the chart the same size as on the worksheet.

The print quality options allow you some control over the chart's printing. The "Draft quality" option is faster and uses less ink or toner. The "Print in black and white" option is for dot matrix printers. This helps to make the distinction between each of the data series of the chart.

The **Options...** button will show you the available options of the printer. The contents of these tabs vary according to the type of printer that's available. These tabs help to :

Determine the paper format as well as the page orientation.
Determine the printing quality, or resolution in dot per inch (dpi), of a chart.
Determine the way that fonts will be printed.
Determine how the memory of the printer will be managed.

Because the contents vary according to the printer, it's up to you to select from the options that are offered.