



Course Manual:

Excel Advanced



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1. EXCEL environment

This environment is similar to other applications: Excel, PowerPoint, Outlook.

1.1.1. Limits

- ▶ A grid consists of a total of **16 384 columns** with alphabetical headers, the last column bearing the XFD header.
- ▶ Each row also has a header. Row headers are numbers ranging from 1 to **1 048 576**.
- ▶ This represents 1,500% more lines and 6,300% more columns than in previous versions.

2. RELATIVE OR ABSOLUTE ADDRESSES

2.1.1. Relative address:

- ▶ Whose formula adjusts during a copy.

2.1.2. Absolute address:

- ▶ Fixed address, it does not change during a copy.

2.1.3. F4 key, to get absolute reference

- ▶ The cell chosen to perform the formula remains the same. Excel returns to the same column and line when copying.

Example of RELATIVE ADDRESSES:

	A	B	C	D
1	Amount	Description	Price	Total
2	20	Computer	2000	=A2*C2
3	25	DVD	275	=A3*C3
4	15	iPad	950	=A4*C4

Example of ABSOLUTES ADDRESSES:

	A	B	C	D
1	Description	Price	Gst	Qst
2			5%	9,975%
3	Computer	2000	B3*\$C\$2	=B3*\$D\$2
4	DVD	275	B4*\$C\$2	=B4*\$D\$2
5	iPad	950	B5*\$C\$2	=B5*\$D\$2

Example of RELATIVES AND ABSOLUTES ADDRESSES:

	A	B	C	D	E
1	Billing Date	DEADLINE 1	DEADLINE 2	DEADLINE 3	DEADLINE 4
2		30	60	90	360
3	24 Nov 2019	=\$A3+B\$2	=\$A3+C\$2	=\$A3+D\$2	=\$A3+E\$2
4	23 Dec 2019	=\$A4+B\$2	=\$A4+C\$2	=\$A4+D\$2	=\$A4+E\$2
5	3 Jan 2020	=\$A5+B\$2	=\$A5+C\$2	=\$A5+D\$2	=\$A5+E\$2
6	25 Jan 2020	=\$A6+B\$2	=\$A6+C\$2	=\$A6+D\$2	=\$A6+E\$2
7	10 March 2020	=\$A7+B\$2	=\$A7+C\$2	=\$A7+D\$2	=\$A7+E\$2

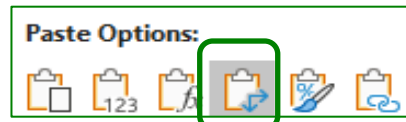
Note:

3. Transpose: Going from rows to columns

1. If necessary, open the file « **Formulas step 1** », sheet « **Transpose** »
2. **Select cells A2 to M12**
3. Click the **Copy** button on **» Home tab » Clipboard Group**

Birth Statistics by Province													
PROV.	January	February	March	April	May	June	July	August	September	October	November	December	
QC	7865	5678	7654	3456	5432	5643	5675	2345	9876	8767	2345	5634	
ON	5675	2345	9876	7865	5678	7654	5678	7654	7865	5678	1321	2345	
BC	3456	2345	3456	5643	4532	2345	5678	7654	3456	5432	3456	5643	
AL	2345	9876	7865	5678	7654	9876	8767	5675	2345	9876	7865	5678	
MA	5643	5675	2345	5675	2345	9876	7865	5678	1321	2345	3456	5643	
SA	3456	2345	3456	5432	5643	5675	2345	3456	2345	3456	5643	4532	
NE	1234	997	987	1321	945	945	899	1112	999	876	1231	899	
NB	987	1234	997	1321	945	899	1112	876	1231	956	1321	876	
TN	564	987	1234	997	987	1321	945	899	1112	999	876	1231	
IPE	987	1321	945	899	1112	876	1231	956	1321	1123	956	1121	

4. Activate cell **A15** to change the **row and column headers**
5. From **» Home tab » Clipboard Group » Paste » Paste Special »** choose **» Transpose** from the **"Paste Special"** dialog box
6. Or right mouse button **»** choose **»**



7. Click **OK**, here's the result below

PROV.	QC	ON	BC	AL	MA	SA	NE	NB	TN	IPE
January	7865	5675	3456	2345	5643	3456	1234	987	564	987
February	5678	2345	2345	9876	5675	2345	997	1234	987	1321
March	7654	9876	3456	7865	2345	3456	987	997	1234	945
April	3456	7865	5643	5678	5675	5432	1321	1321	997	899
May	5432	5678	4532	7654	2345	5643	945	945	987	1112
June	5643	7654	2345	9876	9876	5675	945	899	1321	876
July	5675	5678	5678	8767	7865	2345	899	1112	945	1231
August	2345	7654	7654	5675	5678	3456	1112	876	899	956
September	9876	7865	3456	2345	1321	2345	999	1231	1112	1321
October	8767	5678	5432	9876	2345	3456	876	956	999	1123
November	2345	1321	3456	7865	3456	5643	1231	1321	876	956
December	5634	2345	5643	5678	5643	4532	899	876	1231	1121

4. Statistical functions



It is possible to manually enter the formula or function without the assistance of the tools. It should be remembered, however, that Excel needs very specific instructions, the syntax of the formulas must be respected when it comes to typing them or an error is generated.

EXERCISE Statistical function

1. Open the file « **Formulas step 1** », sheet « **Review 1** »
2. Activate cell **B8** to get the **average** of "**Session 1**"
3. Type **=AVERAGE**, type parenthesis " (+ the cells containing the results of "**Session 1**" = **=AVERAGE(B3:B7)**, the result is "**41.25**"
4. If you want to get the "**Maximum**" grade, you would type "**MAX**" or for the "**Minimum**" grade, you will type "**MIN**"
5. Click **OK**
6. Save to close

5. Date function

5.1.1. Option 1: Date that will not be updated

- ▶ Activate the destination cell to insert the date of the day
- ▶ Press the "**CTRL**" button, then the "**semicolon**" ";" button. Today's date appears.
"**CTRL + ;**"

5.1.2. Option 2: Date to be updated

- ▶ We want to **insert a date** that will **be updated** in future uses of the workbook. **How do I do that?** Activate the destination cell, **TYPE:** The sign = and **type** **TODAY**, add an opening and closing parenthesis (). Confirm with **Enter**↵

=TODAY()

5.1.3. To change the date format

1. **Select** the cell to be formatted.
2. Using the **pop-up menu** obtained by clicking with the right mouse button, click ► **Format Cells** ► **Font tab of the Home tab**
3. **Tab** ► **Number**, in **Category**, choose option ► **Custom**.
4. In the typical area, enter the following code: d mmmm yyyy

6. SUMIF

This function allows you to make the sum of a range according to a criterion. This criterion can apply on the range you want to add or on another range with the sole condition that the two ranges are the same size. Its syntax is SUMIF (range, criteria, [sum_range]) where

Range represents the range on which the criterion will be applied, it can be the same as sum_range

- ▶ Criterion must be in the form of a number, text or expression of comparison. **This criterion must be placed in quotation marks** and cannot depend on a cell. Example: "<>10" (Different from 10)
- ▶ Sum_range is the range on which the sum will be applied.

The function will cover the range and for each cell X, it will check whether the cell Y, from the same position in the range sum_range, actually meets the condition indicated in criterion, if so it adds the value of the X cell to the result. **Example:**

	A	B	C	D	E	F	G
1	Emergency	22	<div>Function Arguments</div> <div>SUMIF</div> <div> Range A1:A6 = {"Emergency";"Surgery";"Emergency";"Medicine";"Surgery";"Surgery"} Criteria "Surgery" = "Surgery" Sum_range B1:B6 = {22;11;55;10;33;45} = 89 </div> <div>Adds the cells specified by a given condition or criteria.</div> <div>Range is the range of cells you want evaluated.</div> <div>Formula result = 89</div> <div> Help on this function <input type="button" value="OK"/> <input type="button" value="Cancel"/> </div>				
2	Surgery	11					
3	Emergency	55					
4	Medicine	10					
5	Surgery	33					
6	Surgery	45					
7							
8	SUMIF: SURGERY	"Surgery";B1:B6)					
9							
10							
11							
12							

Sum of the set = 176

SUMIF = Surgery, answer: 89

FORMULA: =SUMIF(A1:A6;"Surgery";B1:B6)

7. COUNTIF

This function counts the number of cells corresponding to a criterion in a range. It works much like the previous function. Its syntax is COUNTIF(range;criterion) - range represents the range that will be counted.

- ▶ Criterion must be in the form of a number, a text or an expression of comparison. This criterion must be put in quotation marks and cannot depend on a cell. The function runs through each cell in the range, if the content of that cell correspond to the condition indicated in the criterion, it adds 1 to the result.

7.1.1. Example: COUNTIF

In the previous table, how many lines contain the word "surgery"

	A	B
1	Emergency	22
2	Surgery	11
3	Emergency	55
4	Medicine	10
5	Surgery	33
6	Surgery	45
7		
8	SUMIF: SURGERY	89
9	COUNTIF	"Surgery")
10		
11		

Function Arguments

COUNTIF

Range: A1:A6 = {"Emergency";"Surgery";"Emergency";"Medicine";"Surgery";"Surgery"}
Criteria: "Surgery" = "Surgery"

= 3

Counts the number of cells within a range that meet the given condition.

Range is the range of cells from which you want to count nonblank cells.

Formula result = 3

[Help on this function](#)

OK Cancel

=COUNTIF(A1:A6;" Surgery") = 3

8. LARGE - SMALL

This function returns the k-to highest value (or smaller value) of a data series. You can use this feature to select a value based on its rank. So you can use the LARGE function VALEUR to return the highest result, the second or the third. SMALL to return the smallest result, the second or the third.

8.1.1. Example: "LARGE"

In the previous table, what is the largest value in column B

=LARGE(B:B;1)= 55 ("K1" represent "the greatest value")

Emergency	22
Surgery	11
Emergency	55
Medicine	10
Surgery	33
Surgery	45
SUMIF: SURGERY	89
COUNTIF	3
LARGE	=LARGE(B1:B6;1)
SMALL	

Function Arguments

LARGE

Array: B1:B6 = {22;11;55;10;33;45}
K: 1 = 1

= 55

Returns the k-th largest value in a data set. For example, the fifth largest number.

Array is the array of data for which you want to determine the k-th largest value.

Formula result = 55

[Help on this function](#)

If you like to get the second highest value, CHANGE "K" TO READ "2" INSTEAD OF "1"

In the previous table, what is the smallest value in column B

=SMALL(B:B;1)= 10

9. AVERAGEIF

The function AVERAGEIF () refers to the average (arithmetic) of all cells that meet several criteria.

=AVERAGEIF (range;criteria;average range)

Where:

Range: is the range of cells you want evaluated

Criteria is the condition or criteria in the form of a number, expression, or text that defines which cells will be used to find the average.

Average_range are the actual cells to be used to find the average. If omitted, the cells in range are used .

Function Arguments

AVERAGEIF

Range: B2:B5 = {"YES";"YES";"NO";"YES"}

Criteria: "YES" = "YES"

Average_range: C2:C5 = {5;6;2;3}

= 4,666666667

Finds average(arithmetic mean) for the cells specified by a given condition or criteria.

Range is the range of cells you want evaluated.

Formula result = 4,67 \$

[Help on this function](#) OK Cancel

=AVERAGEIF(B2:B5;"YES";C2:C5)			
	A	B	C
1	Fruit basket	Purchase	Price
2	Apple	YES	5,00 \$
3	Pear	YES	6,00 \$
4	Banana	NO	2,00 \$
5	Orange	YES	3,00 \$
6	Average purchase price		4,67 \$
7	Average		4,00 \$

9.1.1. example of condition with text

- ▶ "au*" or "au" or "*au" → all words beginning with 'au', all words ending with 'au', all words containing in.
- ▶ A star can replace any character and does not specify the number of characters replaced. Au* will find aux and others
- ▶ You can also use a ?, this one will replace only 1 character,
- ▶ Example: au? will find aux, but not others.

10. Function IF

Using "IF" to check a condition, then (what should be done?) if not (What to do?)

=IF(A2>40000 ;A2*5% ;0) or =IF(A2>40000 ;A2*5%;"")

If A2 is greather than 40000, then multiply A2 by 5%, if not (in all other cases, 0 or ""

	A	B
1	Amount sale	Bonus
2	48 000,00\$	A2*5%;0)
3	40 500,00\$	2 025,00 \$
4	45 000,00\$	2 250,00 \$
5	38 000,00\$	- \$
6	37 500,00\$	- \$
7		

Function Arguments

IF

Logical_test: A2>40000 = TRUE

Value_if_true: A2*5% = 2400

Value_if_false: 0 = 0

Formula result = 2 400,00 \$

Checks whether a condition is met, and returns one value if TRUE, and another value if FALSE.

Logical_test is any value or expression that can be evaluated to TRUE or FALSE.

Help on this function

OK Cancel

Allows the use of comparison operators: > < = <= >= <> Text must be in quotation marks " "

10.1.1. Example: IF

If the city is not "Montreal", Yes for "expenses account", if FALSE "No" (to read in the cell)

=IF(B2<> " Montreal "; "YES "; " NO ")

E2	=IF(B2<>"Montreal";"YES";"NO")				
	A	B	C	D	E
1	Name	Head offi	Post	Amount sale	Expenses account
2	Allaire, Sylvain	Sherbrooke	President	48 000,00\$	YES
3	Allard, Cosette	Sherbrooke	Vice-President	40 500,00\$	YES
4	Allard, Marie	Montreal	President	45 000,00\$	NO
5	Amos, Armande	New York	Vice-President	38 000,00\$	YES
6	Angus, Marie	Montreal	Executive Director	37 500,00\$	NO

Note:

11. Function AND

Returns TRUE if all arguments are TRUE; FALSE if at least one of the arguments is FALSE.

This function is usually used nested in another logical function

Condition: Exam 1 – 2 and 3, note has to be greater or equal to 60:

Value "TRUE" is "Success", value FALSE is "Failure"

=IF(AND(B2>=60;C2>=60;D2>=60);"Success";"Failure")					
	A	B	C	D	E
1	Participants	Exam 1	Exam 2	Exam 3	Result
2	Corinne Paris	74	65	73	Success
3	Pierrette Paquin	70	74	63	Success
4	André Dupuis	69	63	70	Success
5	Martine Gendron	66	56	64	Failure
6	Pascal Buboïs	52	60	58	Failure

12. Function OR

Returns TRUE if one of the conditions is TRUE and the FALSE if all the conditions are FALSE

The OR function is usually used nested in another logical function.

12.1.1. Examples of IF and OR

Condition: **Sale >=30000**

Or Experience **>=5** (years)

Value "TRUE": **Commission 10%**

Value **FALSE: Commission 5%**

=IF(OR(B2>=30000;C2>=5);B2*10%;B2*5%)				
	A	B	C	D
1	NAME	SALE OF THE MONTH	EXPERIENCE (YEAR)	COMMISSION (\$)
2	PARIS, Christine	32 000,00 \$	8	3 200,00 \$
3	PARIS, Corinne	35 000,00 \$	3	3 500,00 \$
4	VÉZINA, Andrée	25 000,00 \$	6	2 500,00 \$
5	BEAUDRY, Pierre	42 500,00 \$	7	4 250,00 \$
6	BOUCHARD, Étienne	22 500,00 \$	1	1 125,00 \$

13. Function ISBLANK

Copying a formula that refers to an empty cell causes a null result to appear or an error message to appear. This function is often combined with IF

The following example results with **EMPTY CELL "Column G"**. To avoid these problems, as in column G, the following formula will be used:

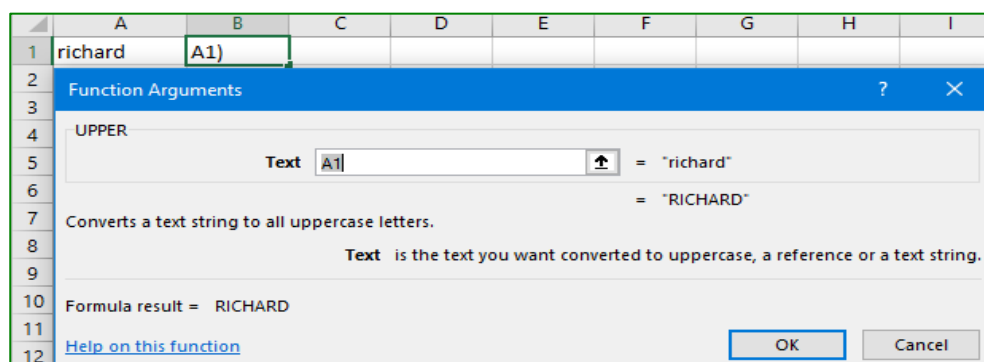
=IF(ISBLANK(G3);"UNPAID";"PAID")	
PAID	2020-10-05
PAID	2020-10-25
UNPAID	
PAID	2020-10-20
UNPAID	
PAID	2020-11-14
UNPAID	
UNPAID	

14. Text formulas

14.1.1. UPPER CASE

To convert text to upper case, here's how to do it:

1. Open a new file
2. Type your last name into cell A1
3. Click in the **Formulas tab**
4. Choose: **TEXT**
5. Choose: **UPPER**
6. In Function Arguments: click in cell A1



14.1.2. LOWER, PROPER, TRIM, SUBSTITUTE

- ▶ **LOWER:** CONVERT YOUR TEXT TO LOWER CASE
- ▶ **TRIM:** Delete spaces before and after but not between
- ▶ **PROPER:** Get the first letter of each word in capital letter:
example: anna maria for Anna Maria or
jean-pierre for Jean-Pierre
- ▶ **SUBSTITUTE:** Replaces existing text with new text, this function will also delete space in a cell. **Attention: you have to respect the case.**

Example

QC1234 9876	REPLACE "QC" BY "ON"	=SUBSTITUTE(A1;"QC";"ON")	ON1234 9876
QC 123 456 789	DELETE ALL SPACES	=SUBSTITUTE(A2;" ";"")	QC123456789



To replace or remove the original cells, you need to copy and then paste the value.

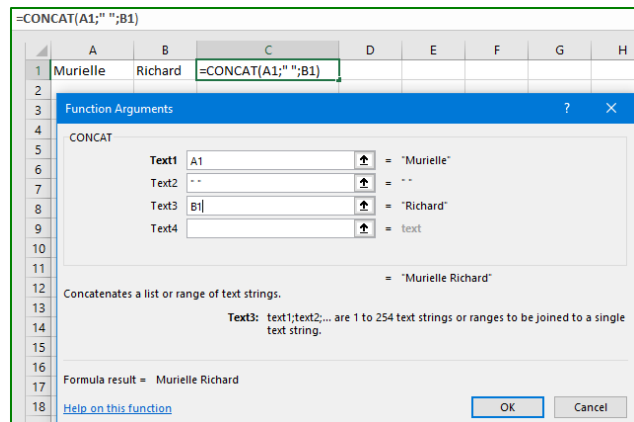
14.1.3. CONCAT

Unite 2 or more columns in a single cell

Here's how to get your first and last name in one cell:

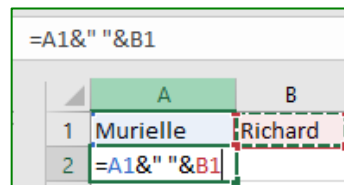
14.1.4. First method

1. Type your first name in cell A1 and your last name in cell B1
2. In cell C1, click in the **Formulas** tab
3. Choose: **TEXT**
4. Choose: **CONCAT**
5. In Function Arguments CONCAT:
6. **Text 1:** Click in cell A1
7. **Text 2:** Make your space (keyboard)
8. **Text 3:** Click in cell B2
9. Watch your result



14.1.5. Second method

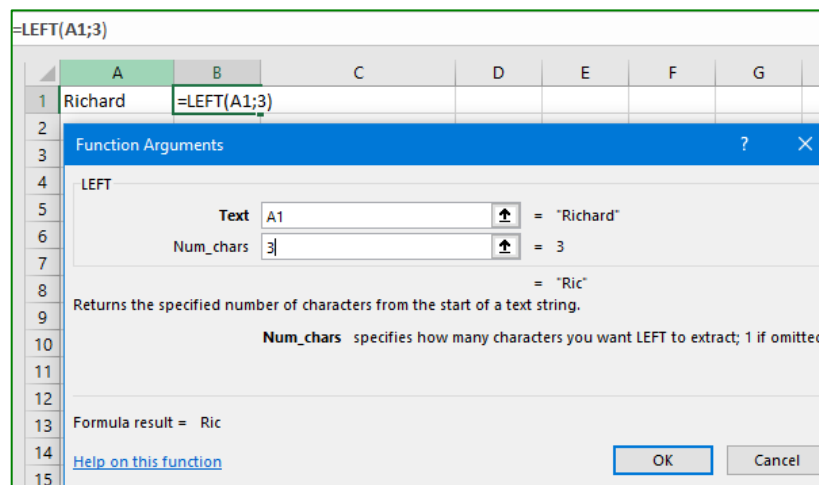
1. Type your first name in cell A1 and your last name in cell B1
2. In A2, type =
3. Click in cell A1
4. Type & (located above number 7)
5. To insert a space between your first and last name, type " " (quotation marks, space, quotation marks)
6. Retype &
7. Click in cell B1 then enter
8. Here is the formula and the result:



14.1.6. LEFT, RIGHT

Steps to get one or a few characters in a cell

1. Type your name in cell A1
2. Click in the **Formulas** tab
3. Choose: **TEXT**
4. Choose: **LEFT** or **RIGHT**



5. In Function Arguments: Text: Click in cell A1 **Num_chars**: Choose the number of characters needed
6. Observe your result which is **RIC**

15. Math and Trigonometry

15.1.1. Formulas: INT

This function is equivalent to ROUNDDOWN (Whole Value)

1. Type the age in cell A1, someone who was born in 2000 and that his birthday is tomorrow
2. In cell A2, type the following formula: TODAY() WHICH REPRESENTS TODAY'S DATE (DYNAMIC DATE)
3. TODAY() MINUS HIS DATE OF BIRTH, CELL A1,
4. Put in parenthesis, then divide by 365.25
5. Your result: 19,99726215, this person will be 20 years old tomorrow only
6. Click in the **Formulas** tab
7. Choose: INT from **MATH & TRIG**, or type in front of your formula=INT(then close your parenthesis at the end. **Do not touch inside of the formula.**
8. Watch your result: THE VALUE IS 19
9. Tomorrow, your result will be 20
10. To save a step: in cell A2, type the following formula:

=INT((TODAY()-A1)/365,25)		
	A	B
1	2000-11-05	
2	19	

16. CONVERTING DATA

This function allows us to separate the text of a cell into several columns. Or for example, to convert a date that is in TEXT format into a DATE format

	A	B	C
1	Serge Emery, 2700 Boul. Labelle, Montréal, Qc, H3J 2Z7		
2	Suzanne Girard, 3333 Beaubien, Montréal, Qc, H3Z 1K6		
3	Pierre Martin, 1234 Du Souvenir, Laval, Qc, H4J 2K0		
4	Joe Bloe, 1 Place du Centre, Ville d'ailleurs, Qc, H0H 0H0		
5	Murielle Richard, 6451 Des Jalesnes, Anjou, Qc, H1M 1Y4		

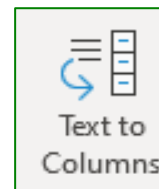
17. Convert

This function allows us to separate the text of a cell into several columns. Or for example, to convert a date that is in TEXT format into a DATE format

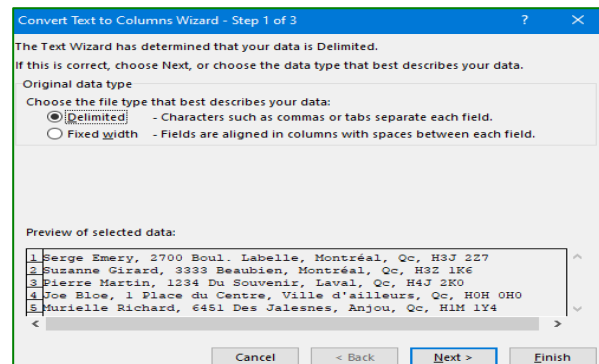
	A	B	C
1	Serge Emery, 2700 Boul. Labelle, Montréal, Qc, H3J 2Z7		
2	Suzanne Girard, 3333 Beaubien, Montréal, Qc, H3Z 1K6		
3	Pierre Martin, 1234 Du Souvenir, Laval, Qc, H4J 2K0		
4	Joe Bloe, 1 Place du Centre, Ville d'ailleurs, Qc, H0H 0H0		
5	Murielle Richard, 6451 Des Jalesnes, Anjou, Qc, H1M 1Y4		

17.1.1. Convert text

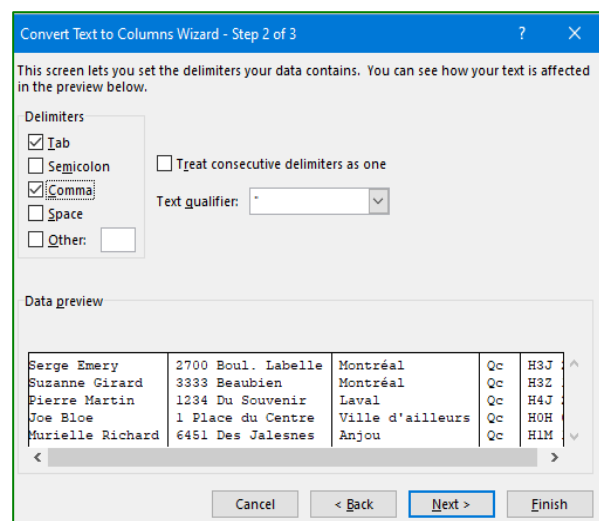
1. Select **A1 to A5**
2. From the **Data** tab
3. Click in **Convert** (Text to Columns)



4. Choose **Delimited** in **Step 1 of 3**

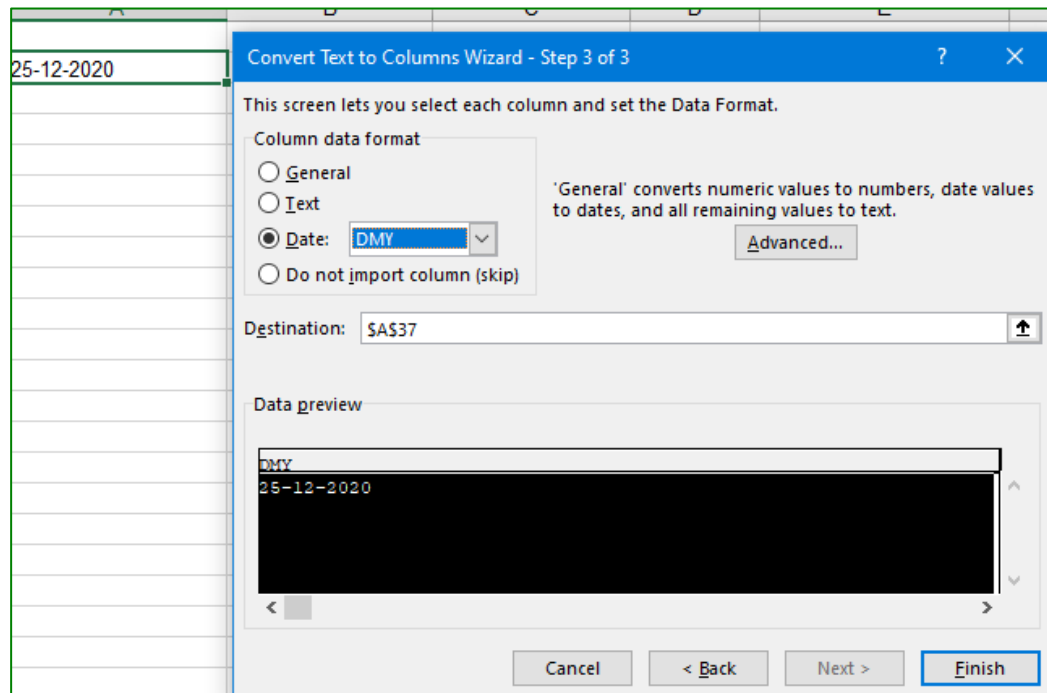


5. Go to **Step 2 out of 3**
6. Choose the **comma**
7. View the result in the **Data preview**
8. Click **Finish**



17.1.2. Convert a date, but in TEXT format

1. Type a date like this: (DD-MM-YYYY), 25-12-2020
2. Notice that EXCEL does not recognize this date
3. Click **Convert**
4. Immediately move to **Step 3 of 3**
5. Choose: **DATE**
6. Choose from the drop-down list the date format we typed: **DMY**
7. Click **Finish**

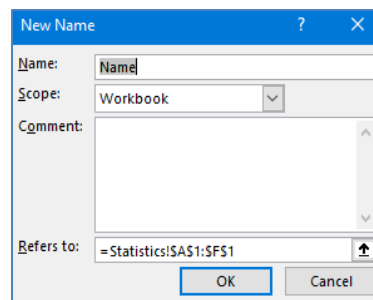
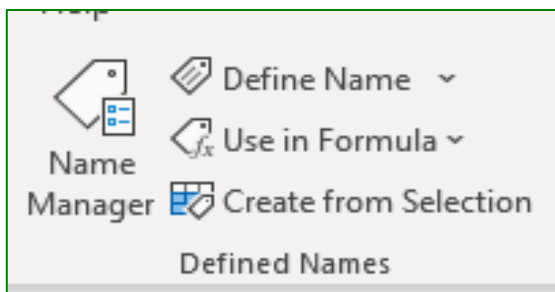


18. NAME MANAGER

A name is an evocative alias that allows you to immediately know the function of a cell reference, a constant, a formula or a table that might otherwise be difficult to guess at first.

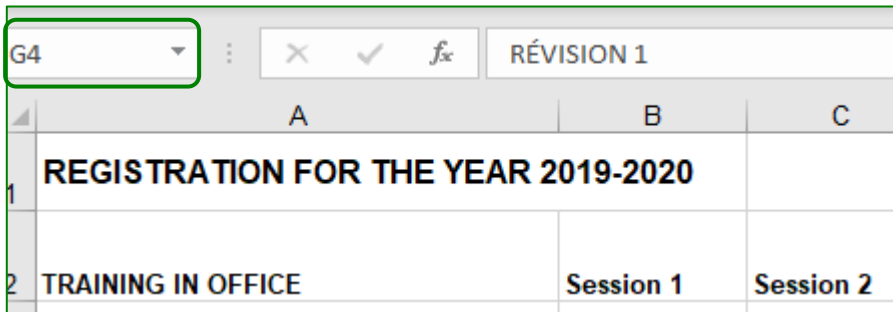
After selecting the range to be named, use

Formulas tab » Define name



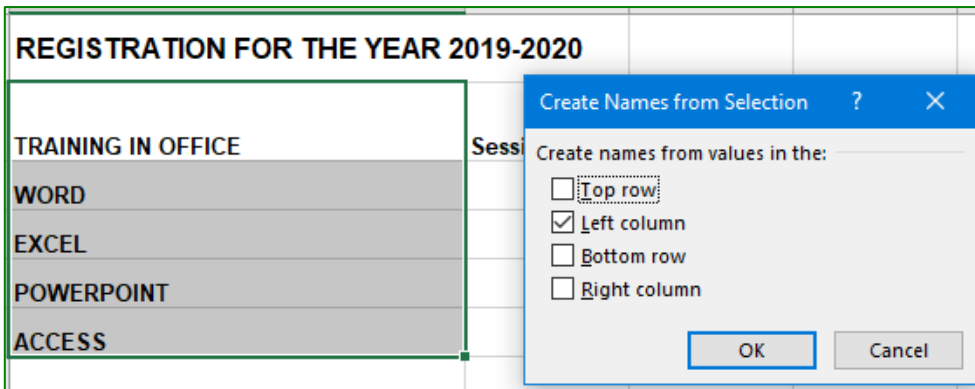
OR

After selecting the range, click on the left portion of the formula bar and enter the name:



OR

After selecting **Create from Selection** from the Formulas tab



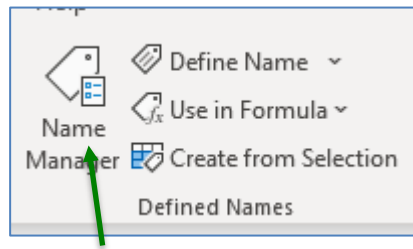
- ▶ To name a cell or cell range:
- ▶ Select a cell or range of cells you want to name.
- ▶ Click in the Name area, to the left of the formula bar.
- ▶ Enter a name that will serve as a reference for the cell. Validate by pressing the Enter button.

The few rules for using a name:

- ▶ The first character of the name must be a letter, an underline (_) or a dash (-). Afterwards you can use letters, numbers, underline or the dot. Your name should not exceed 255 characters.
- ▶ Upper and lower case are not taken into account, in other words, an upper case is equivalent to a lower case letter. So, CLINIC is the same as clinic, Excel won't tell the difference between the two.
- ▶ Make sure that the name used does not correspond to a cell. For example, F7 is a cell, so it is forbidden to use its name.
- ▶ Finally, the name used may refer to an area (thus a cell range), but it may also have as a scope a sheet or a workbook.

18.1.1. Open the Name Manager dialog box

- in the Formulas tab, in the Defined Names group,



Show names

18.1.2. Reach a range name

Once you've set the name of a range, you can easily **reach** the range from the **Name Box** of the **formula bar**.

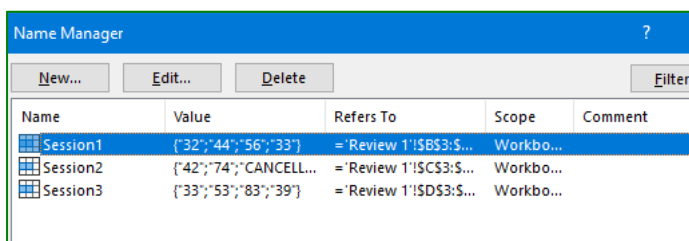
		B	C	D	E
		Février			
		Janvier			
		Mars			
1					
2		Place Versailles			
3		Les chiffres représentent les quantités de boîtes vendues pour chaque produit			
4	PRODUITS	Janvier	Février	Mars	Trimestre 1
5	Rocher au lait	100	308	102	
6	Rocher noir	200	201	202	

18.1.3. Use a range name in a function

Range names are useful for **entering a formula**. Instead of entering the Address of a range, we can use its name. **Example: RechercheV**

18.1.4. Delete a range name

- From the **Formulas** tab ► **Name Manager**
- Select **the name to be deleted** and choose **"Delete"** from the **"Name Manager"** dialog box



		B	C	D
		January		
		February		
		January		
		March		
1	PRODUCTS	January	February	March
2	Black Rock	200	201	202
3	Coconut	150	308	152
4	Almond Black	304	206	302
5	Black and Mint	250	504	252
6	Truffe	500	501	502
7	Stuffed Heart	350	351	352
8	Fruity Night	175	500	177
9	Amandine	325	326	327
10	Hazelnut	410	411	412
11	TOTAL			

19. Cell protection

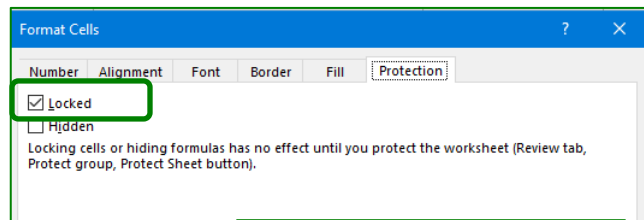
By default, all cells in a sheet are locked. You will find this option in the ► **Home** tab ► **Group Cells** ► **Format** ► **Protect Sheet**. You also can use right click on the sheet to protect.

It is important to protect cells in order to avoid mistakenly removing sometimes complex formulas. **This is done in two steps.** First, you must **unlock every cell** you want to access, only the cells that have been unlocked will be accessible. The second step is to protect the **sheet** with or without a password. You can do this step in ► **Review** tab ► **Protect Sheet**.

19.1.1. STEP 1: Unlocking cells

19.1.2. How to unlock cells

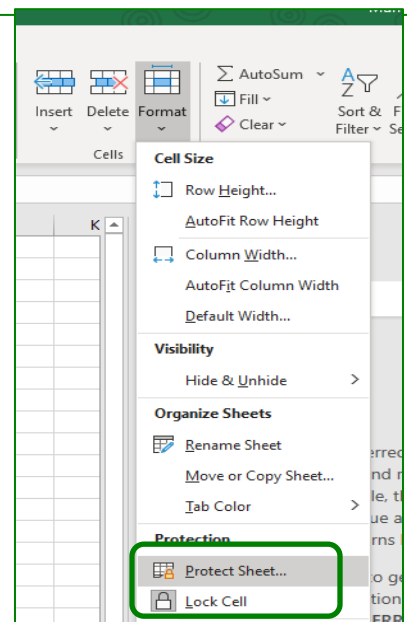
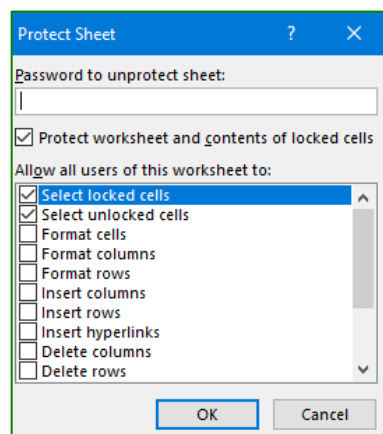
- Determine which cells in the sheet you want to have access to at all times
- From the ► **Home Tab** ► **Group Font** ► **Font tab** ► **Protection**
- Turn off the "Locked" checkbox
- To lock or unlock



19.1.3. STEP 2: Sheet protection

19.1.4. How to protect the sheet

1. From ► **Review** tab ► **Protect Sheet**.
2. Enter a **password** (you can leave this area empty)
3. Click **OK**
4. Protection can also be found in "**Format**" of the "Cells" group



19.1.5. Hide Formulas

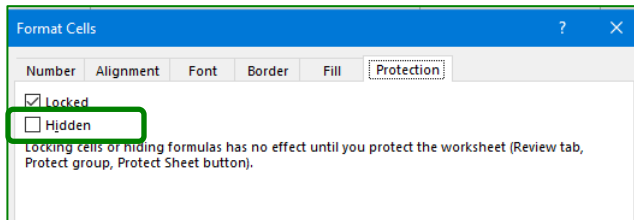
By default, not all formulas in a sheet are hidden.

Sometimes it is important to protect complex formulas. **This is done in two steps.** First, you have to **hide every formula** you want to make invisible. You will find this option in ► **Home tab ► Group Cells ► Format Cells ► Protection**

The second step is to **protect the sheet** with or without a password. You can do this step in the **Review Tab ► Protect Sheet.**

19.1.6. How to hide formulas

- Select cells from the sheet containing formulas to make them invisible
- From ► **Home Tab ► Font Group ► Protection**
- **Check the "Hidden" box**



- Click **OK**



It is important to protect the sheet with a password so that other people can't change cells or formatting in your spreadsheet. Also, when you create a password, you should always enter it in the same way, respecting upper and lower case.

19.1.7. Turn off protection

If you want to change the content of a locked cell or hidden formulas, you should disable the protection of the sheet. Select ► **Review Tab ► Unprotect Sheet**

20. Data validation

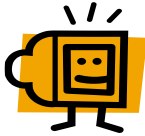
Data validation controls the type of data and values that users enter into a cell. For example, you may want to restrict data entry to a certain range of dates, limit the choices available by using a list, or make sure that only whole numbers have entered.

This article describes how data validation works in Excel and presents the different techniques available. It does not address cell protection, that is, the feature that allows you to "lock" or hide certain cells in a spreadsheet to prevent data from being changed or replaced.

20.1.1. What is validation?

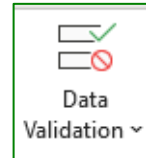
Data validation is an Excel feature that sets restrictions on the type and values of data allowed in a cell. You can set up data validation to prevent users from entering data that is not valid. If you prefer, you can allow users to enter invalid data but notify them when they type it into cells. You also have the ability to display messages detailing the type of input expected for cells, as well as instructions to help users correct errors.

If users ignore this message and type invalid data into the cell, such as a two or five digit number, you can display an error message.



Data validation commands are located under the Data tab in the Data Tools group.

Be careful, you have to respect the case

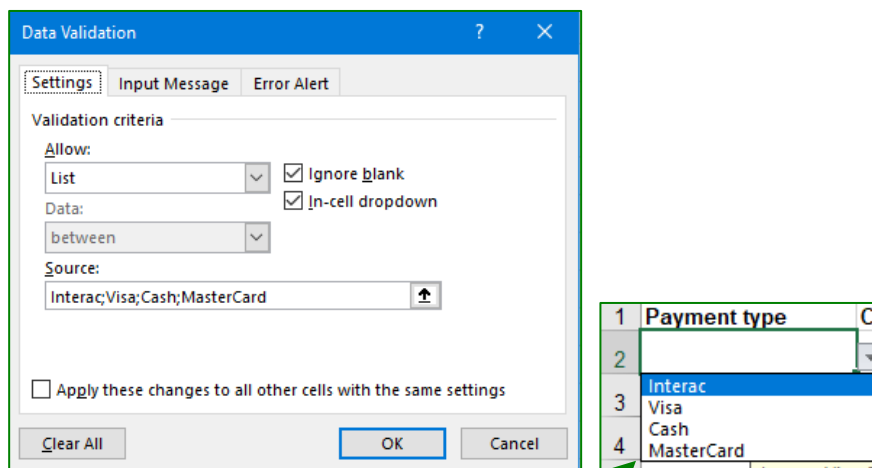


20.1.2. When to use data validation?

Data validation is particularly useful when sharing a workbook with others in your organization, for which you want the data entered to be accurate and consistent.

You can use data validation to perform, among other things, the following tasks:

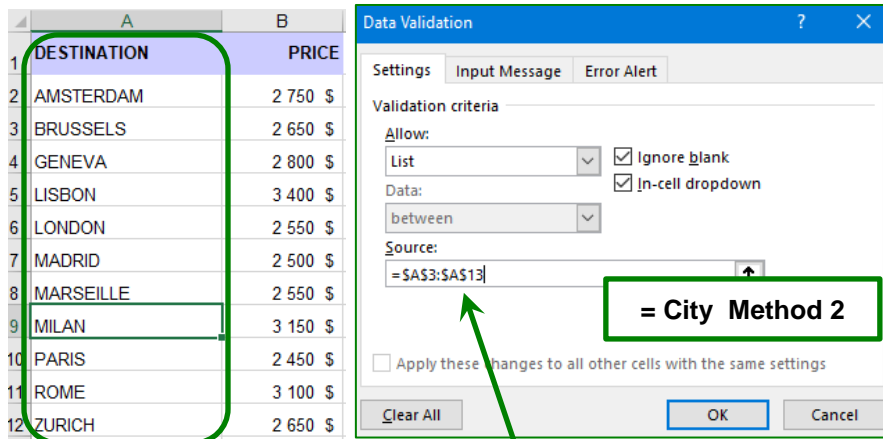
20.1.3. Limit data with a list



1. In a new sheet ➔ in **Calculation Intermediate** workbook, insert the column **Payment Type** into **A1**.
2. Select cell **A2** or the entire **A2:A10** range, then go to the **Data Validation** box
3. Select ➔ **List** ➔ in **Validation criteria** ➔ **Allow**
4. Type in **SOURCES:**
5. Interac;Visa;Cash;MasterCard.
6. Click **OK**
7. Watch the drop-down menu in the cell

20.1.4. Limit data with a list (Method 2)

1. Select data (In this example: Cities)
2. Name your list (In this example: CITY)
3. In "Date Validation" and then "Sources", type "=" and then the name you gave to the list

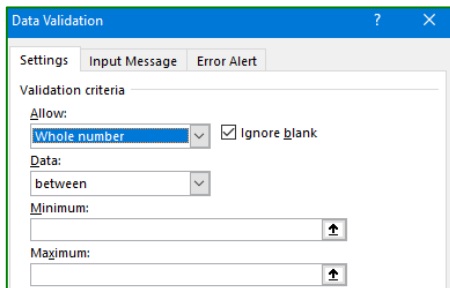


20.1.5. Limit data with a list (Method 3)

1. Select cells to insert validation
2. In "Sources," click on the reference and select the data

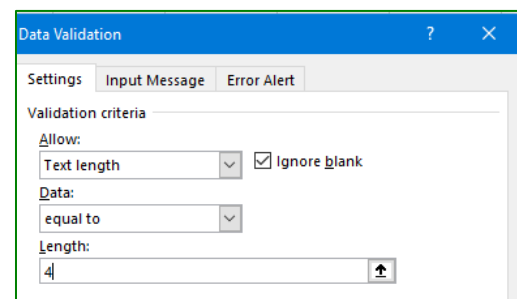
20.1.6. Limit numbers outside of a specified range

In a particular cell, you can specify a minimum or maximum limit



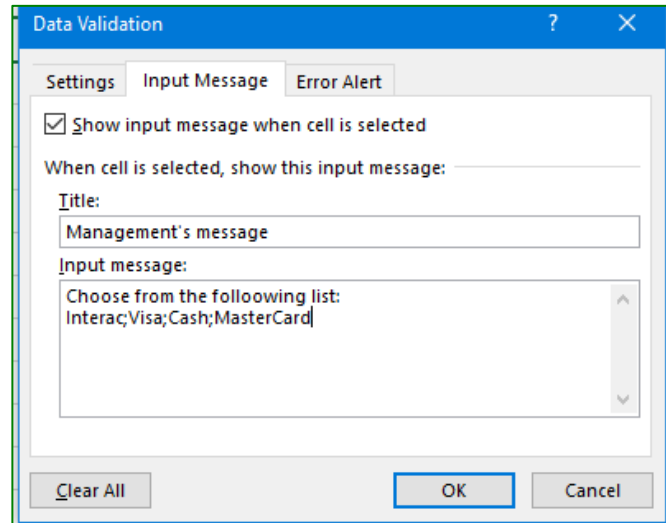
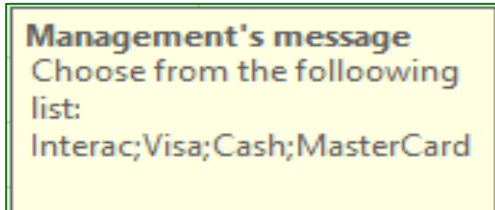
20.1.7. Limit the number of text characters

You can limit the authorized text in a cell to 10 characters or less. Similarly, you can set the specific length of the number or text so that it corresponds to the length, **example:** Maximum of 4 characters.

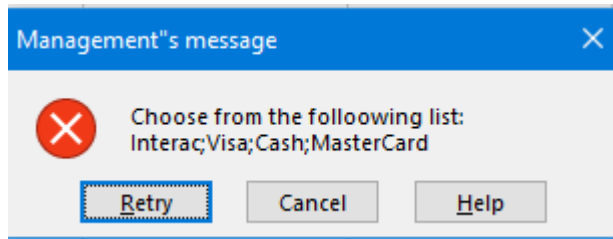


20.1.8. Data validation messages

What users see when they enter invalid data into a cell depends on how you set up data validation. You can choose to display an *input message* when the user selects the cell. Input messages are generally used to offer users advice on the type of data that can be entered into the cell. You can move this message if you wish. It then remains displayed until you move to another cell or press Esc.



20.1.9. View an error message for invalid data.



20.1.10. There are 3 types of error message:

Icon	Type	Use to
	Stop	Prevent users from entering invalid data into a cell. A Stop Alert offers two options: Retry or Cancel .
	Warning	Warns users that the data entered is not valid, without preventing them from entering it. When a Warning message appears, users can click Yes to accept the invalid entry, no to change the invalid entry, or Cancel to delete the invalid entry.
	Information	Informs users that the data entered is not valid, without preventing them from entering it. This type of error message is the most flexible. When an Information message appears, users can click OK to accept the value or Cancel to opt out.

21. Error value

ERROR VALUE	CAUSE AND SOLUTION
#VALUE!	Error due to invalid name This error occurs when the app does not recognize the text contained in a formula. <ul style="list-style-type: none"> ▶ You used a cell name or cell range that does not exist. ▶ A name has been misspelled. ▶ Text was entered into a formula without being placed in quotation marks. ▶ A function has been misspelled.
#DIV/0	Zero Division Error <ul style="list-style-type: none"> ▶ Entering a formula that makes an explicit 0 division: for example = 5/0 ▶ Using a reference to an empty cell or a cell containing 0 as a divider.
#NAME?	Error due to invalid name This error occurs when the app does not recognize the text contained in a formula. <ul style="list-style-type: none"> ▶ You used a cell name or cell range that does not exist. ▶ A name has been misspelled. ▶ Text was entered into a formula without being placed in quotation marks. ▶ A function has been misspelled.
#REF!	Invalid cell reference error This error occurs when a cell's coordinates are not valid. <ul style="list-style-type: none"> ▶ You removed or merged cells that other formulas referred to. ▶ You used an invalid cell link.
#NUM!	Number error This error occurs if a formula or function contains invalid numerical values. <ul style="list-style-type: none"> ▶ A number is too large or too small to be represented in Excel. Values must range from $-1*10^{307}$ and $1*10^{307}$ ▶ A function that runs by iteration fails to find a result. ▶ You used an incorrect argument in a function that requires a numerical argument.
#N/A	Missing value error This error occurs when a value necessary for the formula to function properly is missing. <ul style="list-style-type: none"> ▶ A mandatory argument in the formula is absent. ▶ An inappropriate argument is used in a formula. ▶ VLOOKUP, HLOOKUP or INDEX functions search an unsorted line or column.
#NULL!	Zero value error This error occurs when you specify an intersection of two areas that, in reality, do not intersect. The intersection operator is a character of spacing between references. Example =SUM(A1 A10). The two points (:) are missing to separate the two cells.

21.1.1. Ignore errors

It may be interesting to hide some of the planned errors that, however, do not compromise the accuracy of the calculations.

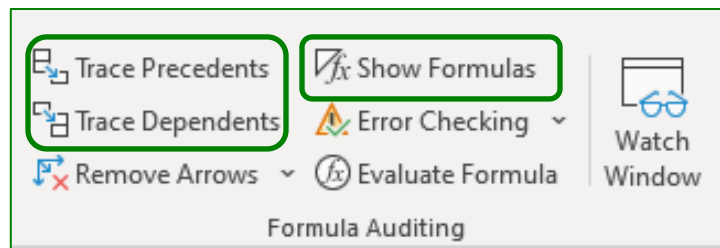
To do this, it is necessary to change Excel's options: **Office button** → **Excel Options** → **Formulas**.

Error Checking: Uncheck **Enable background error checking**

Error checking rules: Select the types of errors Excel must indicate.

22. CIRCULAR REFERENCES

A formula cannot refer to itself or to another cell whose formula refers to itself. So, if in cell A1 you write **=A1** or **=A2+A3** while the formula in A3 is **=A1**, Excel warns you of the presence of a circular reference. Correct the formula **AUDITS AND CHECKS**



22.1.1. To view and print formulas

Save your workbook to save the final version of your table, then:

1. Click the **formulas** tab → Formula Auditing → **Show Formulas**.
2. Check the **preview** before you print: your table should fit on a single page

22.1.2. To identify precedents and dependents

1. Go to a cell containing a **formula**
2. Click the **Formulas** tab → **Trace Precedents**
 - ▶ The cells used by the formula will be visualized.
3. Go to a cell containing a **number**
4. Click the **Formulas** tab → **Trace Dependents**
 - ▶ The formulas that use the cell will be visualized.

22.1.3. Print audit

- ▶ Check the preview one last time to use only one sheet of paper

To remove audit arrows:

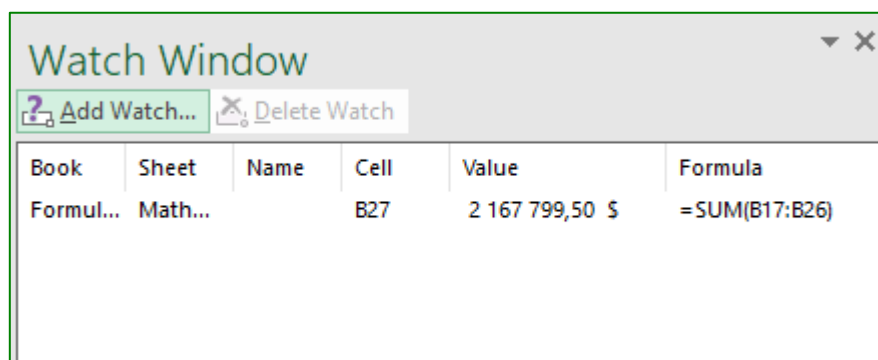
- ▶ Click the **Formulas** tab ➔ **Remove Arrows**

22.1.4. Watch Window

In a complex Excel file, it may be useful to use the "**Watch**" window. This feature allows you to observe what happens on selected cells in your file when you work in other sections of the file.



Just click and add cells to be monitored when changes are made to other cells affecting this result. There is no need to split the screen or use other display modes.



Watch Window equal a link – go to a particular cell.

Note:

23. Function VLOOKUP

Search functions allow you to search for a value in a table, for example: a name, a product number, invoice number, phone, address, etc.

Definition: This feature searches for a value in the first column of a table, which returns the value contained on the same row and in another column.

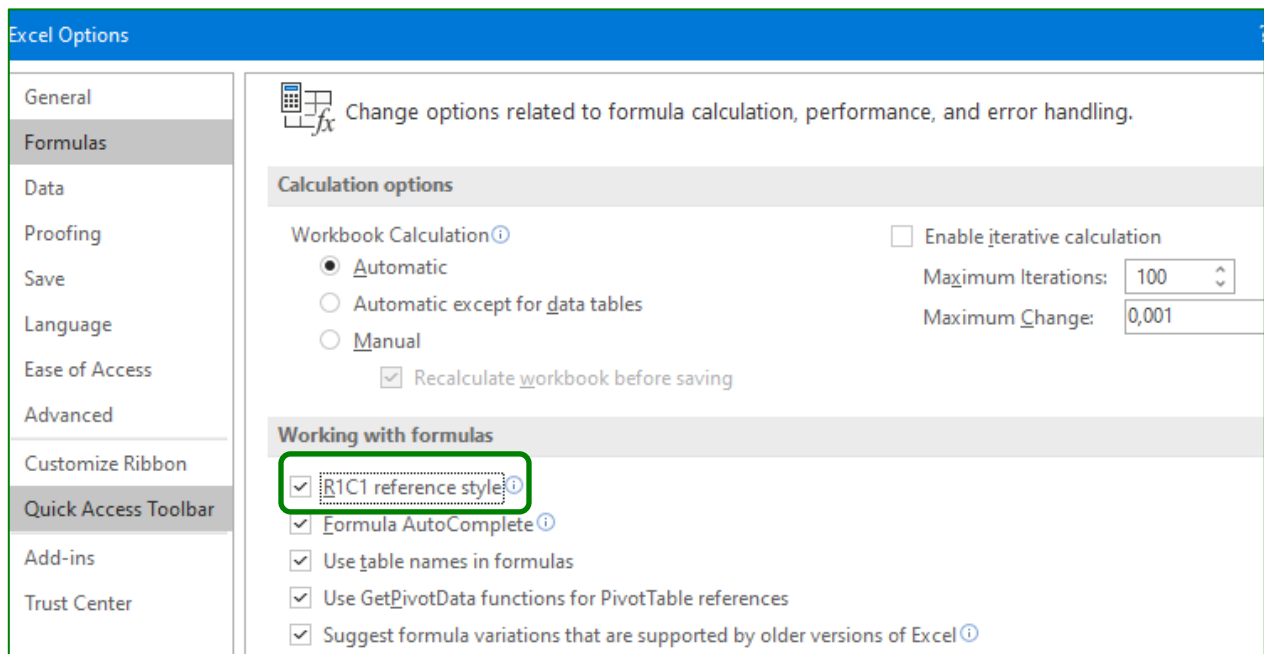
Dialog box "FUNCTION ARGUMENT"

VLOOKUP

Lookup_value	Identifies the cell that contains the value that the function looks for in the first column of the table
Table_array	Identifies the range (either by an already defined name or by the data selection) in which the value search is performed
Col_index_num	Shows which column the value is in. The columns are numbered from the left.
Range_lookup	Enter TRUE if you want the function to return the value closest to the one requested " This argument is optional ". Enter FALSE if you only want exact values. If no value is linked to it, this feature will return #N/A. If you don't specify it, EXCEL assumes that the value is TRUE

23.1.1. How to change the columns display to numbers

From the "File" tab, "Options" and "Formulas", check: **R1C1 reference style** in "Working with formulas"



23.1.2. EXERCISE VLOOKUP

Look for the name of the company for which the customer number is "VS-1255", How to do it?

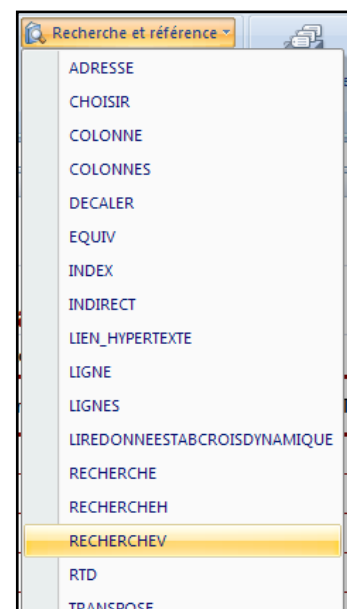
1. Open the file "Travel_RechercheV"

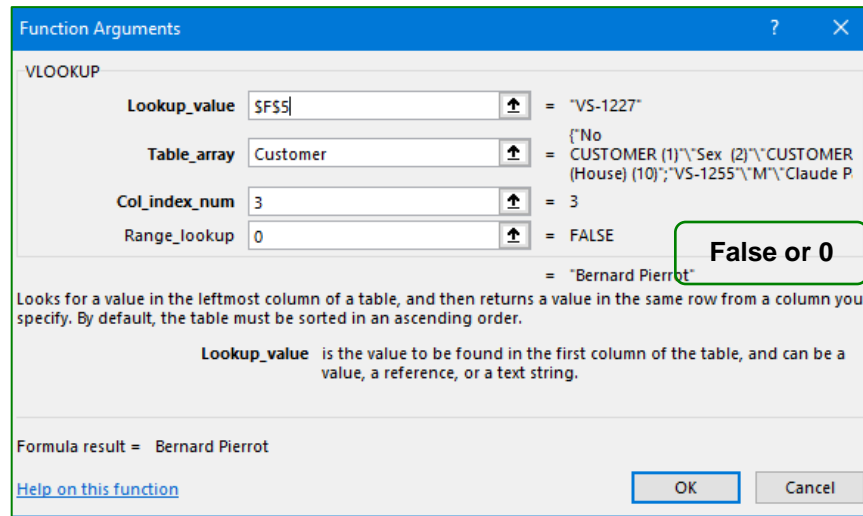
To make it easier, you'll give your data range a name, select the range **A1 to J308** from the "Customer" sheet

N_CLIENT (1)	Sex (2)	Customer (3)	D.O.B. (4)	Age (5)
VS-1255	M	Claude Patry	2013-04-11	7
VS-1444	M	Peter Schweitzer	2012-02-22	8
VS-1457	M	Pierre-Luc Brisson	2011-08-17	8
VS-1496	M	Tony Gingras	2011-08-26	8
VS-1212	F	Ann Clyde	2009-11-23	10
VS-1227	M	Bernard Pierrot	2009-11-16	10
VS-1326	M	Joël Hanna	2009-11-23	10

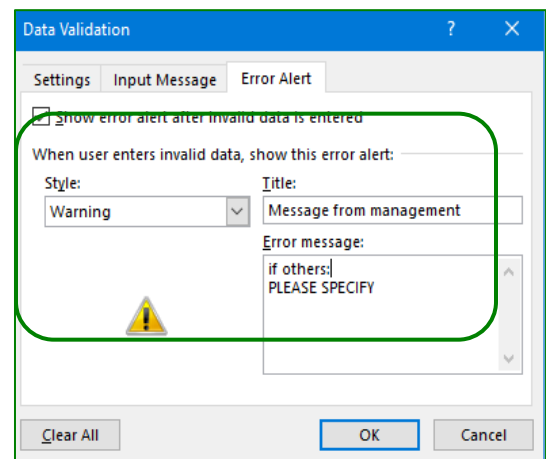
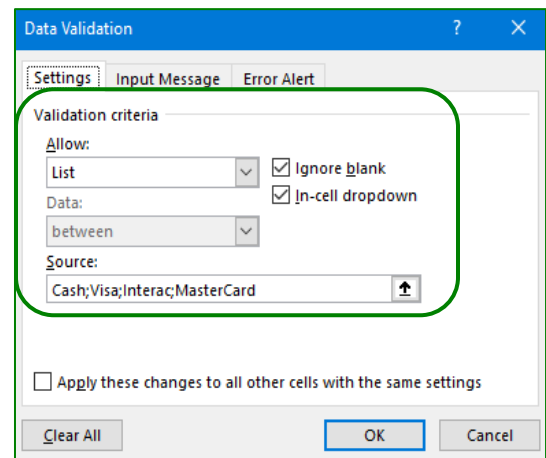
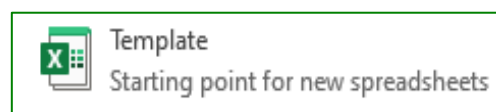
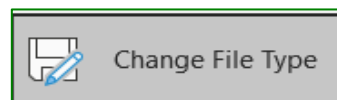
2. From the ►► **Formulas** tab ►► Define Name ►► type "Customer" in ►► **New Name**

3. Return to sheet "Invoice", click in cell **B5** to search for the customer's name "VS-1255"
4. Click ►► **Lookup & Reference** ►► **Formula Tab**, choose ►► **VLOOKUP**
5. You are now in the "Function Arguments" dialog box
6. **Lookup_value** is the "VS-1255" customer number, so you need to **click** cell F5, which represents the desired value
7. **Table_array**: Enter the name of the table "Customer"
8. **Col_index_num** is the column number of the argument you're looking for, i.e. that the customer's name is located in column Number 2, insert the number "3"
9. **Range_lookup**: type **FALSE** or value **0**





10. Click **OK**
11. Answer: =VLOOKUP(F5;Customer;3;False)
12. **To save time** ► Lock F5 ► \$F\$5
13. Repeat the same steps to search for the address, and contacts.
14. See the table on the next page for column number identification.
15. In cells A11 and A12, insert DATA VALIDATION to choose a city
16. In cells F11 and F12, VLOOKUP to get the amount of the trip
If the F12 cell is empty, a formula must be inserted to eliminate an N/A value when the sheet will be protected in writing
17. Data Validation to create in Cell C16:
Formulas in cell F17 and F18
18. Unlock cells to allow data to enter
19. **Protect your sheet and save as "Template"**
20. To save as **"Template"** ► File

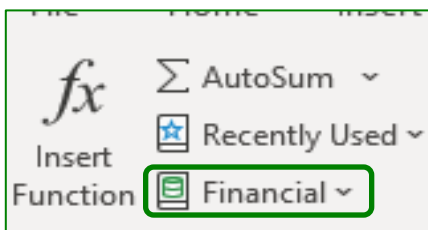


FORMATION CAD INC

N_CLIENT (1)	Sex (2)	Customer (3)	D.O.B. (4)	Age (5)	Address (6)	City (7)	Province (8)	P.C. (9)	Phone (10)
VS-1255	M	Claude Patry	2013-04-11	7	14 Eloi	Montreal	Quebec	H2C 1R5	(514) 364-7851
VS-1444		Peter Schweitzer	2012-02-22	8	30 Trent	Roxboro	Quebec	H1N 3L4	(450) 963-2587
VS-1457	Mr	Pierre-Luc Brisson	2011-08-17	8	1271 Macau	Laval	Quebec	H7P 5T6	(450) 454-5258
VS-1496	M	Tony Gingras	2011-08-26	8	20 Avenue De Neuve	Lorraine	Quebec	J6Z 1W9	(450) 747-7740
VS-1212	F	Ann Clyde	2009-11-23	10	14180 Therrien	Mirabel	Quebec	J7J 1J5	(450) 777-7745
VS-1227	M	Bernard Pierrot	2009-11-16	10	12th Street	Montreal	Quebec	H3P 1R6	(514) 264-7896
VS-1326	M	Joël Hanna	2009-11-23	10	229 Michel Brisset	Varennnes	Quebec	J3X 1A3	(450) 456-1256
VS-1236	F	Camillia Elachqar	2008-09-28	11	230 Berri	Montreal	Quebec	H4C 1M2	(514) 289-7458
VS-1476	M	Robert Antoine	2008-09-28	11	2525 Acres	Dorval	Quebec	H4L 4J1	(514) 355-7485
VS-1497	M	Tony Vilek	2009-04-23	10	1230 Nobert	Chomedey	Quebec	G6Y 7J8	(450) 698-5141
VS-1228	M	Bertrand Bolduc	2007-08-16	12	1225 The Abyss	Boucherville	Quebec	J4B 8C6	(450) 245-5567
VS-1504	M	Yves Ferrera	2007-12-21	12	18 De Magog Street	Blainville	Quebec	J7B 1S1	(450) 245-5538
VS-1380	F	Marie-Anne Clyde	2006-09-29	13	1421 Chateaubriant	Mascouche	Quebec	J7K 3B3	(450) 454-5266
VS-1250	M	Christian Bédard	2004-10-03	15	11345 Gilles Villeneuve	Mirabel	Quebec	J7J 1T8	(450) 777-7739
VS-1443	M	Paulo Lemire	2004-10-03	15	293 Gauthier	Repentigny	Quebec	J6A 4P2	(450) 123-7559
VS-1318	M	Jean Paradis	2003-08-23	16	120 St-denis Street	Montreal	Quebec	H5T 4N5	(514) 267-7458
VS-1201	M	Alain Huot	2003-01-24	17	241 Cedars - 3	St. Sophia	Quebec	J0N 1H0	(450) 999-2026
VS-1344	F	Karine Marder Samuelson	2003-03-05	17	315 Francois-Baillargé	Laval	Quebec	H7L 5:3	(450) 705-3265
VS-1389	F	Maryline Lariviere	2003-01-28	17	1245 12th Avenue	Ste-Julie	Quebec	G4T 5T6	(450) 963-2147
VS-1246	M	Charles Godin	2001-08-14	18	2030 Arthur-Buies Square	Montreal	Quebec	H1L 3G6	(514) 247-1251
VS-1272	F	Denise Nadeau	2000-08-30	19	643 Frontenac Street	Lachine	Quebec	H9V 9G9	(514) 233-4444
VS-1329	M	John Gibis	2000-08-11	19	194 Hogue	St. Sophia	Quebec	J0N 1H0	(450) 999-2025
VS-1398	M	Michel Brown	2000-09-30	19	1280 De La Chanterelle	Boisbriand	Quebec	J7G 2W8	(450) 245-5553

24. Financial function

The financial functions can be used to calculate the **repayment of a loan**, the **future value of an investment**, the **amortization** of a property, etc.



- Choose "**Financial**" in the library of the Formulas Tab and select a category and click on **PMT** or **NPER** or **IPMT** or **PPMT** or **PV** from the "**Select Function**" area



The amounts payable as well as the refunds are represented by a negative number.

24.1.1. Description Financial function

FV	Returns the future value of an investment
IPMT	Returns the interest payment for an investment
NPER	Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate
PER	Type " 1 ", this number represents the period for which you want to calculate the payment, example: 4 for the fourth month, etc.
PMT	Represents the amount of payment per period. This amount is fixed for the duration of the loan
PPMT	Represents the monthly capital amount of a loan
PV	Returns the present value of an investment
RATE	Represents the interest rate on the loan

24.1.2. "FINANCIAL" FUNCTION: NPER

LOOK FOR THE NUMBER OF PERIODS TO REPAY A LOAN:

You borrow the sum of **\$25,000** at a rate of 8%, however you have **\$775** per month to repay your loan, Looking for the duration of the loan. **How do I do that?**

1. Open the file « **Formulas step 1** », sheet: **Finance**
2. Activate cell **F4**

NPER - number of payments to be made based on capital, rate and amount available					
Capital	25 000 \$	Interest	8%	775 \$	36

3. From the "Formulas" tab, click "Financial" and then choose **NPER**
4. **RATE:** Click in cell **D4**, interest to pay "8%" this value must be **divided by 12** (12 months): D4/12
5. **PMT:** available "\$775" to make monthly payments: Cell E4
6. **PV:** Type the negative sign "-" then click in cell B4, amount of the loan "**\$25,000**"
7. Click **OK**, your answer is 36

The image shows the 'Function Arguments' dialog box for the NPER function. The arguments are: Rate (D4/12), Pmt (E4), Pv (-B4), Fv (empty), and Type (empty). The calculated result is 36.44194375, which is rounded to 36. The dialog box also includes a description of the function and a 'Formula result =' field showing 36.

8. Here is the formula:

=NPER(D4/12;E4;-B4)

Note:

24.1.3. "FINANCIAL" FUNCTION: PMT IPMT PPMT

VALUE OF MONTHLY PAYMENTS

You borrow **\$30,000** at an **8%** rate, and the term of the loan is **3 years**, how do you do it?

PMT - fixed amount to be paid for an amount, rate and number of years					
Capital	30 000 \$	Interest	8%	Years (Duration)	3
		PMT Monthly	IPMT Interest	PPMT Capital	30 000 \$
	1	940,07 \$	200,00 \$	740,09 \$	29 259,91 \$

1. **PMT**: represents the value to be repaid per month which is 940 \$ Here is the formula

```
=PMT($D$10/12;$F$10*12;-$B$10;1)
```

Function Arguments

PMT

Rate	\$D\$10/12	=	0,006666667
Nper	\$F\$10*12	=	36
Pv	-\$B\$10	=	-30000
Fv	1	=	1
Type		=	number

= 940,0662941

Calculates the payment for a loan based on constant payments and a constant interest rate.

Nper is the total number of payments for the loan.

Formula result = 940,07 \$

[Help on this function](#)

OK Cancel

2. **IPMT**: represents the interest to be repaid each month. Here is the formula

```
=IPMT($D$10/12;B12;$F$10*12;-$B$10)
```

3. **PPMT**: represents the capital value that is repaid per month

```
=PPMT($D$10/12;B12;$F$10*12;-$B$10)
```

25. Pivot Table

25.1.1. Introduction

The Pivot Table (PT or report) is a multidimensional database analysis tool. It is dynamic because any change in the source results in the report being updated when the update is triggered. The PT allows you to quickly group, combine and compare a lot of information.

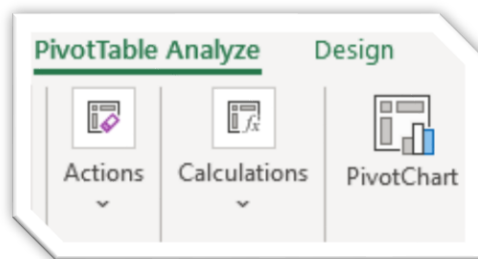
Each column header in the database becomes a pivot table field. Each next row corresponds to a record.

The presentation of the summary table is defined by the filter and grouping options, the position of the fields and the formulas applied. The PT allows predefined calculations (sum, number, count, average, product, numbers, max, min, stdev, stdevp, var, varp). You can also create your own formulas by inserting calculated fields and elements.

The effectiveness of a pivot table is based on a properly structured database.

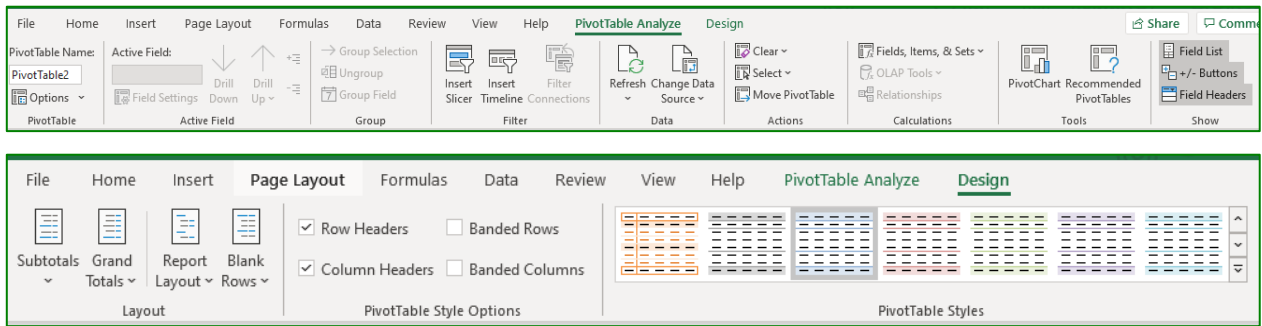
Each cell in the first row contains the name of the fields (header).

- ▶ The following rows contain the recordings.
- ▶ The database should not contain two identical field names.
- ▶ Avoid empty cells in fields that store numerical data.
- ▶ The database should not contain empty columns.
- ▶ The database should not contain empty rows.
- ▶ The database should store only raw data (no sub-total rows)



Note:

All the most appropriate commands are in the two context tabs: **PivotTable Analyze and Design**

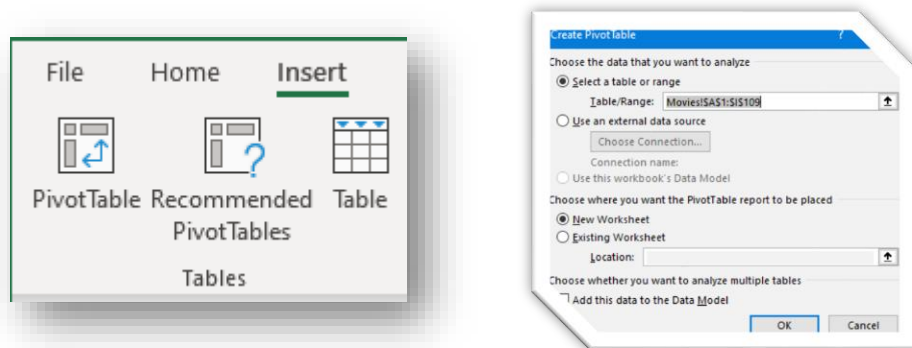


The pivot table command is very useful when you need to filter multiple fields from the same list (database). This command creates a table that calculates values using a synthesis function, such as "Sum", "Average", and other...

At the last step of this assistance, **EXCEL** creates a table template in which you can drag different fields from your list. **Excel** gives names to fields, here are the names with the definitions:

25.1.2. Start the PIVOT TABLE

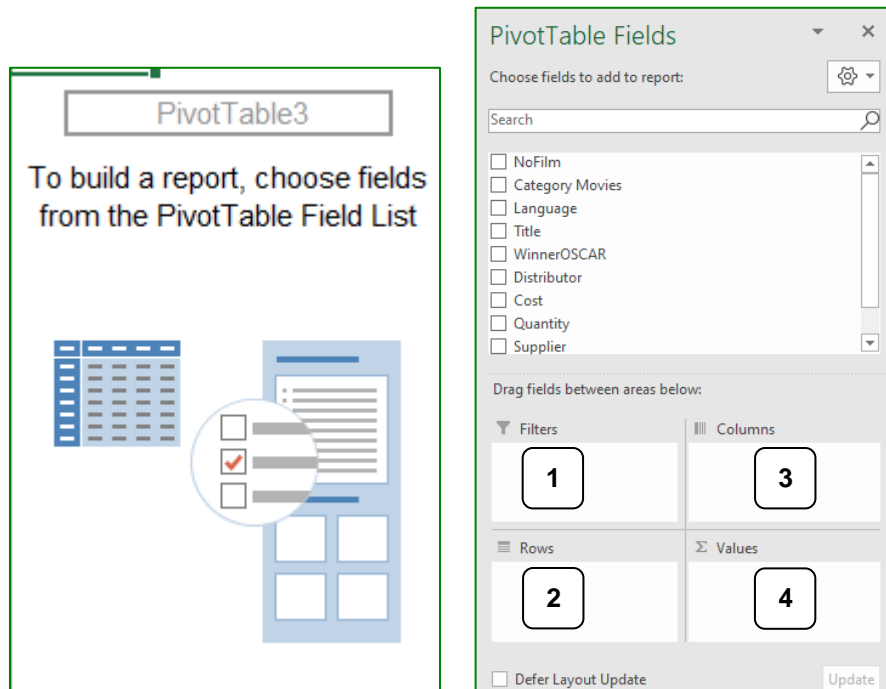
1. Select a **single cell** from the database
2. From the **►Insert** tab **►Click** **►Pivot Table**



3. Select data to be analyzed as needed
4. Or use another external data source
5. Determine where you want Excel to display your pivot table
 - In a new sheet or an existing sheet
6. Click **► OK**

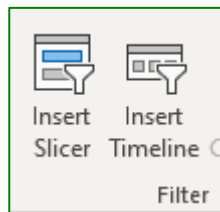
Note:

25.1.3. ELEMENTS OF A PIVOT TABLE



25.1.4. Filters and Slicer

- ▶ This field is used to extract data according to the selected item. This field represents the **Page Field**.
- ▶ **Now, if more than a filter, we will use the Slicer**



- ▶ The "Filters" area is used to hide or display subgroups of data in the pivot table.
- ▶ New cells, including an icon, appear in the spreadsheet, just above the PT.
- ▶ Click on the icon to see the window that lists the elements of the filter field.
- ▶ The unchecked items are not taken into account in the report.
- ▶ Each time one or more items are checked in the choice list, the pivot table is updated and presents only the corresponding filtered data.
- ▶ A filter icon (funnel-shaped image) is displayed in the PT when elements are filtered.
- ▶ A filter icon also appears on the right of the name, in the "Pivot Table Fields" window. You can also filter the field by clicking this button.
- ▶ You can also accumulate and sort multiple fields in the filter area of the report.

25.1.5. Rows

- ▶ The **values** of this field are **arranged** horizontally. Every element of this field is displayed **on a row**.

25.1.6. Columns

- ▶ The **values** are **arranged** vertically. Every element of this field is displayed **in a column**.

25.1.7. Data field or Values

- ▶ The data in this field is used to make the **calculations**.

Filters

Column field

WinnerOSCAR (All) ①										
Sum of Quantity	Category									
Language	Movies									
Distributor	Action	Adult	Cartoons	Comedy	General	Horror	Tragedy	Grand Total		
E ②	Alliance			64			89	153		
	Columbia Pictures	75				64	152	291		
	Fox Video	75	75	64		89	77	380		
	Paramount Pictures	89					174	263		
	Universal Pictures	91		76			77	244		
	Walt Disney						271	271		
	Warner Bros.	64						64		
E Total		394	75	204		153	840	1666		
F ④	Alliance		142		319		217	678		
	Columbia Pictures	418		103	166		89	776		
	Fox Video	256		77	166	99	524	1122		
	Imavision 21	164	89		64	125	307	922		
	Paramount Pictures	182			341	200	455	1293		
	Universal Pictures	98		71	83	86	81	419		
	Walt Disney	286		75	75	263	467	1241		
	Warner Bros.	237			83	89	442	950		
F Total		1641	231	326	978	1095	548	2582	7401	
Grand Total		2035	231	401	1182	1095	701	3422	9067	

Row field

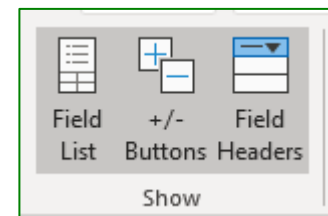
Data field

25.1.8. View and hide

The **"Field List"** button hides and displays the "PivotTable Fields" window. The "hidden" setting prevents the window from being automatically displayed when a report cell is selected.

"+/- Buttons" allows you to display or hide the develop/reduce buttons in the report.

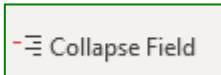
The **"Field Headers"** option hides and displays the field headers of the rows and columns.



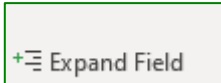
25.1.9. Active field

You can read or change the name of the active field from the input area

When you select rows or columns labels, the two buttons containing a "greener" and a "less red" button are available. The 'Plus' expands all the elements of the active field and the 'Minus' collapses all elements of the **active field**.

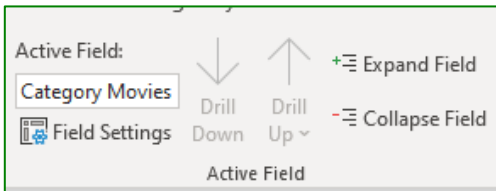


To hide the details



To view more details

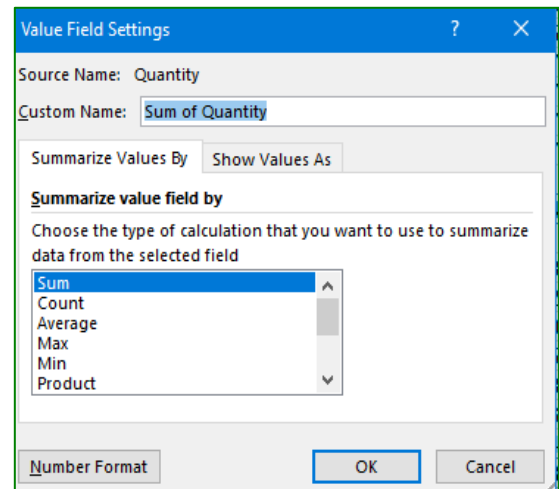
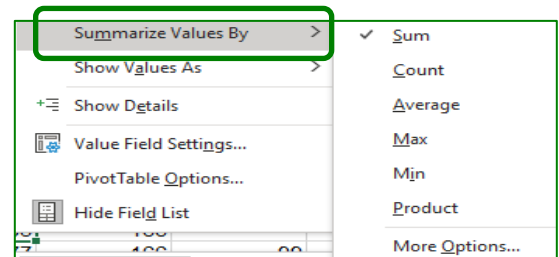
The **"Field Settings"** button shows the dialog box of the same name, depending on the active cell.



25.1.10. Field settings – Summarize Values

25.1.11. Common operations

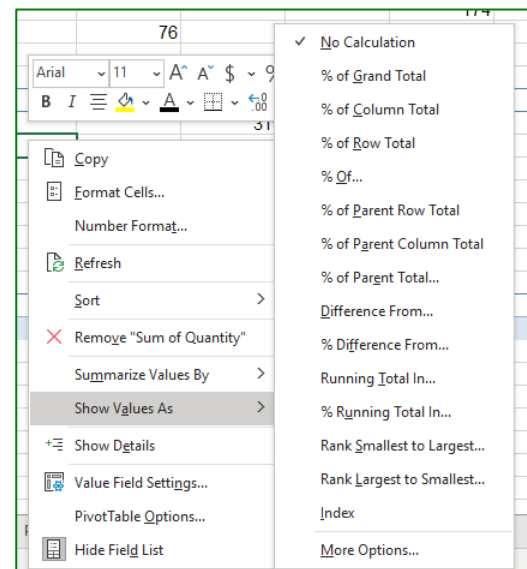
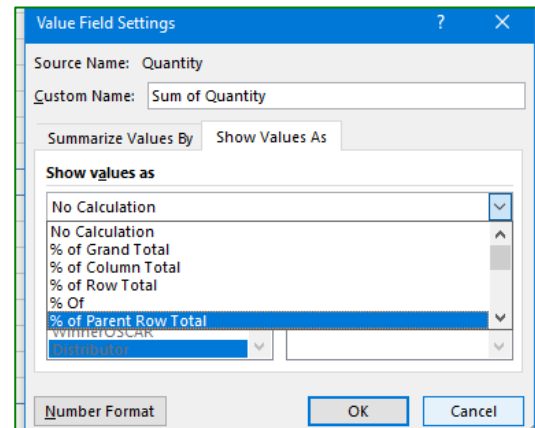
1. **"Sum"** returns the sum of all the values of the field.
2. **"Count"** returns the number of records in the field.
3. **"Average"** returns the average of all the values in this field.
4. **"Max"** returns the highest value of the field.
5. **"Min"** returns the smallest value of the field.
6. **"Product"** multiplies all the values of the field.
7. **"Count Numbers"** returns the number of digital records in the field.
8. **"StdDev"** returns the standard deviation of the field.
9. **"StdDevp"** returns the standard deviation of a population.
10. **"Var"** returns the variance of the field.
11. **"Varp"** returns the variance of a population.



25.1.12. Field settings – Show values

25.1.13. Percentage operations

1. **"No calculation"** uses routine operations.
2. **"% of Row Total"** calculates the percentage of the row's total.
3. **"% of Column Total"** calculates the percentage of the column's total.
4. **"% of Grand Total"** calculates the percentage of the overall total.
5. **"Index"** calculates relatively $((\text{value in cell}) \times (\text{Grand Total})) / ((\text{Grand Total of the line}) \times (\text{Grand Total of the column}))$.
6. **"Running Total In"** calculates a cumulative total for the base field.
7. **"Difference from"** calculates the percentage difference relative to the value of the base item in the Base Field.
8. **"% of"** calculates the percentage of the value of the base item in the Base Field.
9. **"% Difference From"** calculates the percentage relative to the value of the base item in the Base Field.



The "Field Settings" window also contains other information and options:

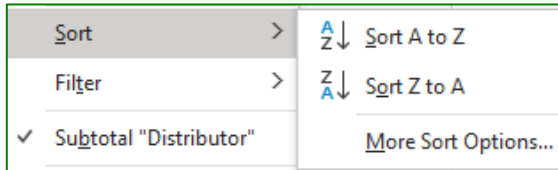
1. The name of the source field.
2. **The custom name** that appears in the report and that is changeable.
3. The "Number Format" button to customize the values presented in the PT. This will freeze the field format even if the data is changed or moved.

You can accumulate multiple summaries of the same field in the area. Then assign a type of calculation to each. This allows you to quickly visualize additional information on the field to be analyzed.

25.1.14. Sort

The **"Sort"** group allows you to sort the selection in ascending or decreasing order. If you have any doubts about the result (depending on the cell selected), click the "Sort by value" button beforehand. The window contains a description of the sorting that will be done.

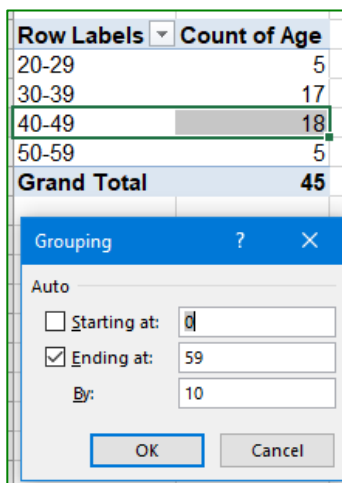
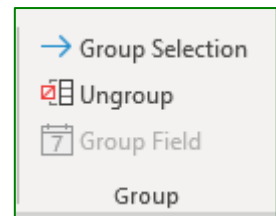
We will get this option with the right click mouse button.



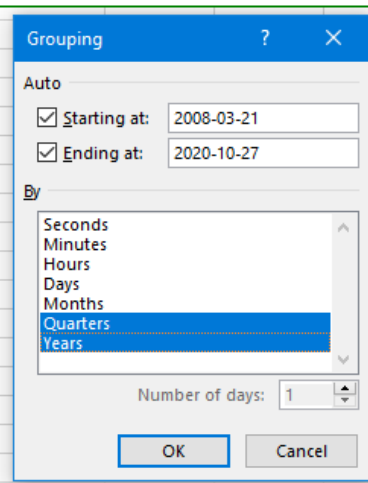
25.1.15. Group

The **"Group selection"** button creates a set from the items you select in the report.

- 1 When you expand the group, each item value will appear separately. When the group is collapsed, the PT displays the total of the constituent elements.
- 2 The **"Ungroup"** allows you to delete the selected group.
- 3 The **"Group field"** button allows you to summarize numerical or Date elements in the report. For example, select a date in the PT and then click the "Group Field" button: Choose the type of grouping (per month).



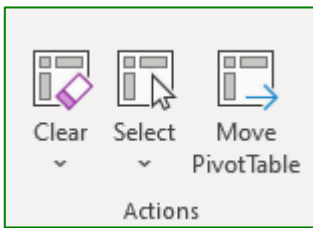
Row Labels	Sum of Salary week
2008	11 795,50 \$
2009	4 412,00 \$
2010	6 599,00 \$
2011	18 054,50 \$
2012	13 312,50 \$
2013	7 232,00 \$
2014	8 085,00 \$
2015	5 978,00 \$
2016	25 712,75 \$
2017	23 287,00 \$
2018	10 385,00 \$
2019	17 216,50 \$
2020	5 316,00 \$
Grand Total	157 385,75 \$



- 4 The pivot table then returns the elements grouped according to the chosen element:
- 5 You can select multiple group options at the same time. Click the **"Ungroup"** button to remove groups.
- 6 Numerical elements can be grouped in the same way. Example for grouping values by ten:

25.1.16. Actions

The "**Clear**" button contains two options that delete the entire pivot table or delete all filters in the report.



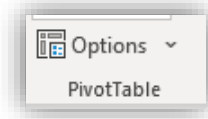
The "**Select**" button allows you to quickly activate certain cells in the report:

1. Labels and values.
2. Labels alone.
3. Values alone.
4. The entire pivot table. Make sure the "**Enable Selection**" option is enabled and that the full PT is selected to un-grey the menus.

The "**Move Pivot Table**" button changes the location of the report to another cell in the workbook or to a new sheet. This method keeps your custom cell formatting after moving.

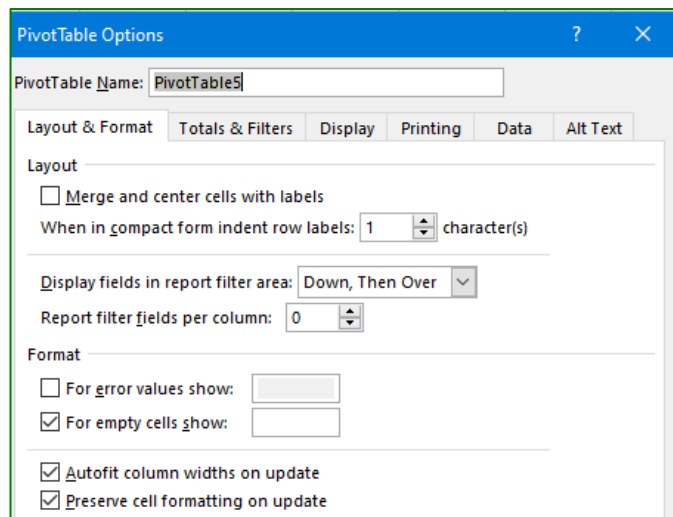
25.1.17. Pivot table options

The "Options" button displays the "Pivot Table Options" dialog box. The window is made up of 5 tabs.



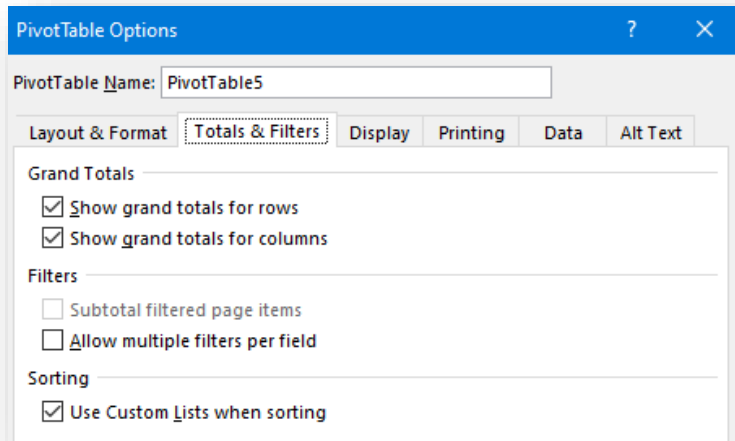
25.1.18. The "Layout & Format" tab

1. Merge and center the cells with labels.
2. Indent row labels when the report is in compact mode (between 0 and 127 characters).
3. Sets the display order of the filter fields (Down, then over or Over, then down).
4. Assigns value to empty cells. Indicate 0 in the numerical fields, to make later calculations more reliable.
5. Preserve cells formatting when updating data.



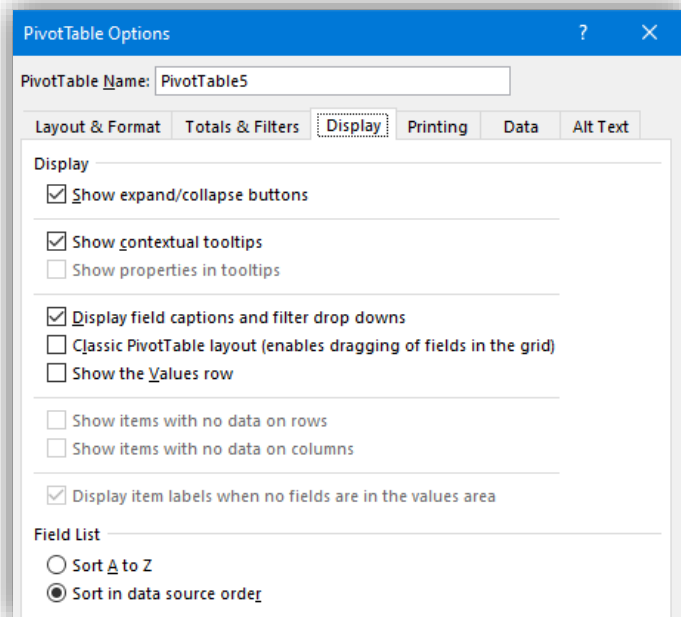
25.1.19. The "Totals and Filters" tab

1. Shows or hides row and column totals
2. Adds or removes filtered items in sub-totals.
3. Allows multiple filters per field (to use all values in sub-totals and grand totals, otherwise the calculation will not take into account hidden/filtered items).



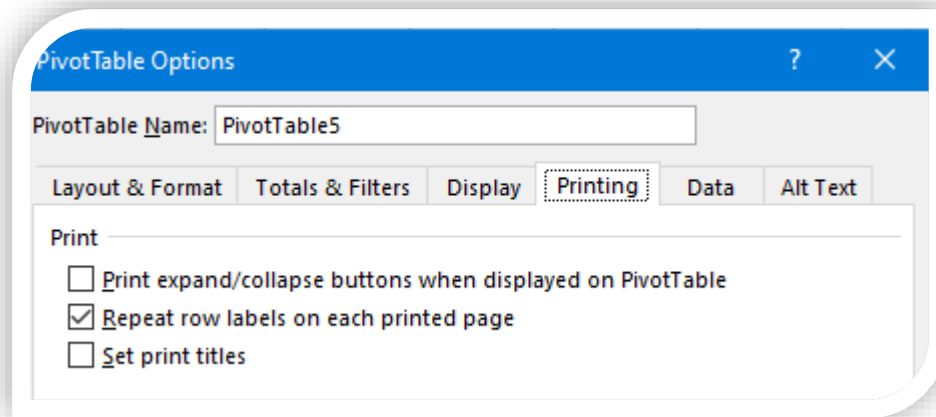
25.1.20. The "Display" tab

1. Shows or hides expand/collapse buttons
2. Shows or hides the tooltips that appear when you move the mouse over a value cell in the report. The tooltip info returns the name of the field, the value, as well as the names of row and column labels.
3. The "Classic layout" option allows you to drag/drop.
4. Shows or hides line items that do not contain value.



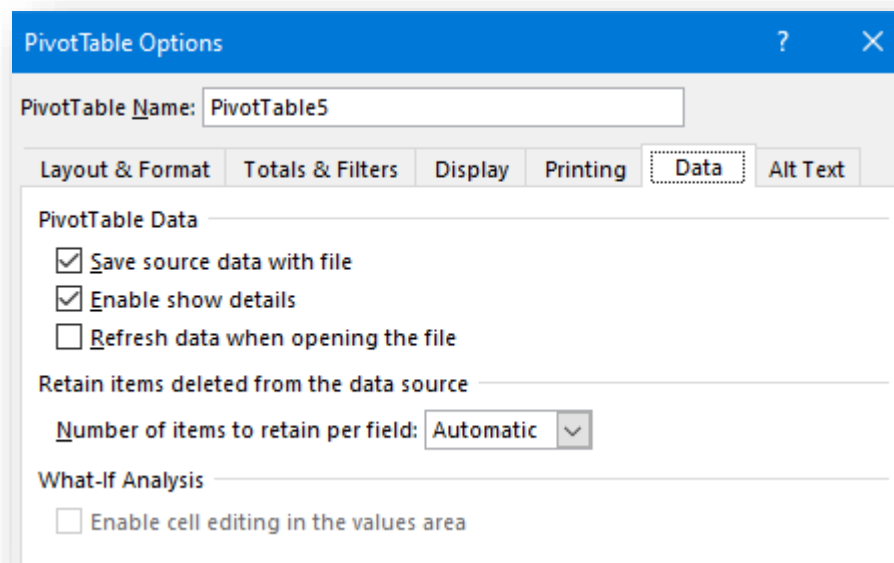
25.1.21. The "Printing" tab

1. Prints expand/collapse buttons. It is best to uncheck this option to improve the readability of the print.
2. The option "Repeat row labels on each printed page".
3. Set print titles: repeats column headers, rows and column labels for all printed pages.



25.1.22. The "Data" tab

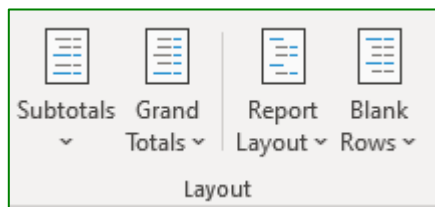
1. The "Save source data with file" option backs up data from the external source with the workbook.
2. "Enable show details" to extract and view data detail in a new spreadsheet.
3. Refresh data when opening the file.



25.1.23. Design tab

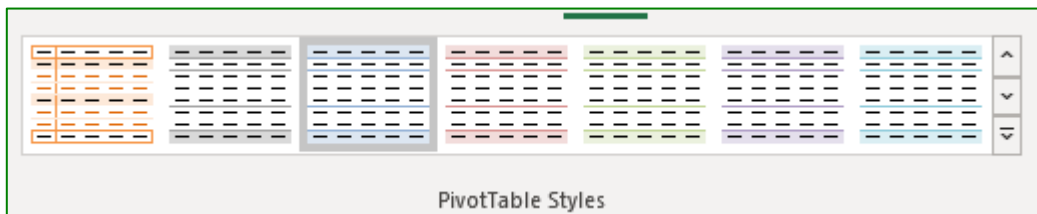
25.1.24. Layout

1. The "Subtotals" button allows you to: not display sub-totals. Show all sub-totals at the bottom of the group. Show all sub-totals at the top of the group.
2. The "Grand Totals" button allows you to: Turn off for lines and columns. Turn on for lines and columns. Turn on for lines only. Turn on for columns only.
3. The "Report Layout" button defines the type of pivot table. Compact form is the default format under Excel2007. In Outline form, each row label has its own **column**. **Tabular** form displays the data as a table.
4. The "Blank Rows" button inserts or removes a blank line between each group of items. The insertion of lines spreads and improves the presentation of the report.

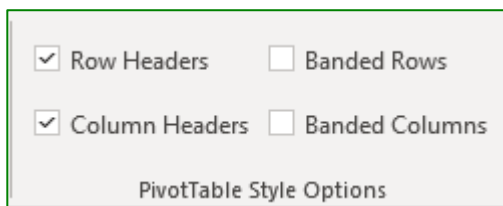


25.1.25. Style

The checkboxes define the behavior of the style applied to the PT. Options make it easier to format and read the report.

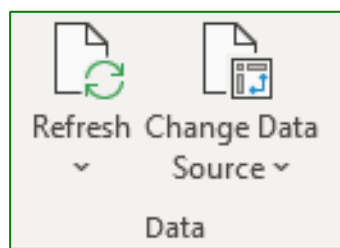


1. Row Headers displays a formatting on the first row of the report.
2. Column headers display a particular formatting on the first column of the report.
3. Banded Rows allows different colors to be applied between the even and odd rows of the report.
4. Banded columns offer different colors to be applied between the even and odd columns of the report.



5. This option allows you to choose a style of presentation from a wide range of predefined formats.
6. Click in the lower right corner of the drop-down menu to see the different styles. You can also remove a style from the list or add a custom style. A custom style can be defined as the quick style of the default pivot table, for the document.

25.1.26. Data group



25.1.27. Refresh data

It is important to always refresh the data when you're working

25.1.28. Change the date source

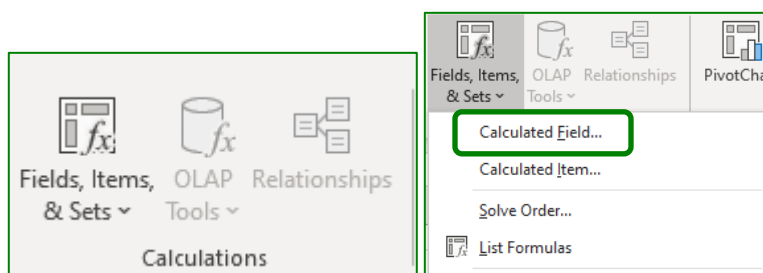
Also, make sure the pivot table includes all the new data

25.1.29. Calculations

25.1.30. Calculated fields

If the predefined formulas are not enough to summarize the value fields, you have the ability to create personal functions tailored to your project. These formulas are called calculated fields and calculated elements.

The calculated fields are based on data from other fields. To create the formula, select the "Analyse" tab in the ribbon. Click the "Fields, Items, & Sets" button in the "Calculations" group. Choose the "Calculated Field" option. Name your formula in the "Name" zone. It is also in this drop-down menu that you select an existing calculated field in order to change or delete it.

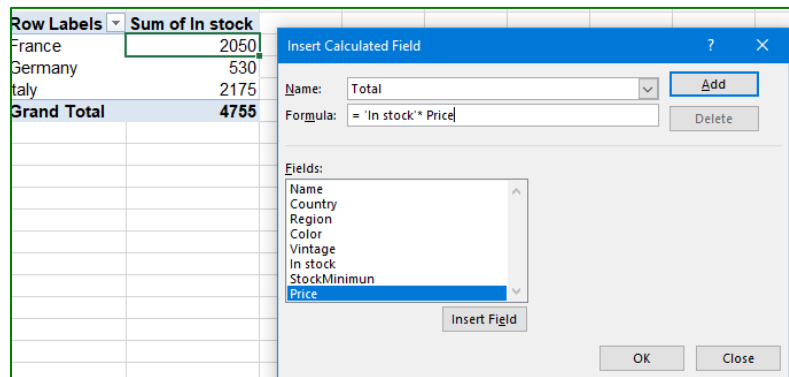


Example: To find the total price of wine in "Stock" per country

1. Open **"Pivot Table"** » Workbook » **"Wine"** sheet
2. **Create a Pivot Table**

FORMATION CAD INC

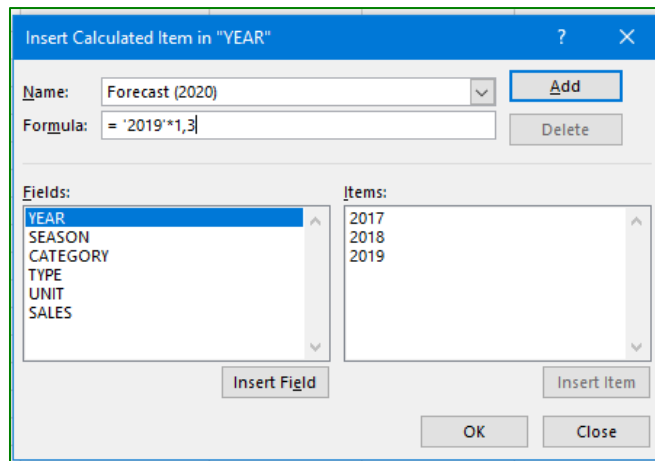
3. Insert **"Country"** in row label and **"In Stock"** to **"Values"**
4. Choose **"Calculated Field"**
 ▶ Group Calculations
5. Name: tape **"Total"**
6. Formulas: **= in stock * Price**
7. **Click OK**
8. See your result



25.1.31. Calculated Items

Here's an example: You want a 30% increase in sales for the current year

1. Open **"Pivot Table"** ▶ Workbook ▶ **"Boutique"** sheet
2. **Create a Pivot Table**
3. Insert **"Season"** in Row field, **"Sales"** in **"Values"** and **"Year"** in columns field
4. To create a "Calculated Item", the mouse must be in any year (Columns field)
5. Choose **"Calculated Item"** ▶ Group Calculations
6. Tape **"Forecast 2020 into "Name"**
7. In **"Formula,"** keep the equal, Double-click in the year (Example: 2019) and multiply by the desired value. (Example: 30% more than the previous year) so "1.3"
Formulas: **= 2019 * 1,3**
8. **Click OK**
9. Here is the result



Sum of SALES	Column Labels				
Row Labels	2017	2018	2019	Forecast (2020)	Grand Total
Autumn	20 183,00 \$	43 437,00 \$	23 483,00 \$	30 527,90 \$	117 630,90 \$
Spring	26 078,00 \$	32 904,00 \$	36 098,00 \$	46 927,40 \$	142 007,40 \$
Summer	24 972,00 \$	14 743,00 \$	37 401,00 \$	48 621,30 \$	125 737,30 \$
Winter	16 944,00 \$	23 838,00 \$	24 117,00 \$	31 352,10 \$	96 251,10 \$
Grand Total	88 177,00 \$	114 922,00 \$	121 099,00 \$	157 428,70 \$	481 626,70 \$

26. LIST OF SYMBOLS, CUSTOM FORMAT

Order Format / cell / numbers / custom category

Symbol	Meaning
0	Always displays a number. If there is no number at this location, display a 0. For example, code 0.00 always shows two decimal places.
#	Shows a number only if there is one. Doesn't show anything if there isn't one.
?	Like code 0 but displays a space instead of non-significant zeros.
,	The comma serves as a decimal separator. Can be defined as a point in the Windows configuration panel.
%	Converts the number into a percentage by multiplying by 100 and adding the sign.
\$	Shows the currency symbol.
()	Shows parentheses.
Space	The space is used to separate the thousands. Can be modified for a comma in the Windows configuration panel.
—	The underscore leaves a space of 1 character. Can be used to align numbers both in the column and on the decimal symbol.
d/m/yy	Date format posted for January 5, 1985 - 5/1/85
dd-mmm-yyyy	Date format posted for January 5, 1985 - 05-Jan-1985
dd/mm/yy	Date format: posts 01/01/00 for January or 12/12/00 for December.
mmm	Shows the abbreviated names of the month (Jan to Dec).
mmmm	Shows the full name of the month (January to December).
yy	Shows the double-digit year
yyyy	Shows the four-digit year
H	Shows hours without zero (1 to 23).
HH	Shows hours with zero (01 to 23).
hh:mm	Shows hours and minutes
[]	Shows hours above 24 or minutes and seconds above 60. For example, [h]:mm gives 72:00 if the cell contains the value 3.
[color]	Shows according to the specified color. The available colors are black, blue, cyan, green, magenta, red, white or yellow. Example: [red].
"text"	Shows the text specified in quotation marks. For example: # ##0" haba" shows 1 234 hob if the value 1234 is entered in the cell.

27. Exercise Condition IF / AND

This exercise is in the file "Formulas step 2", Sheet: Ex. 2 Cond. "AND"

SCHOOL RESULTS			CONDITION IF / AND
Student	Course A 356 French	In boarding school on the Campus	RefundPension to CampusSi Success at 85% or more
PARIS, Christine	93	YES	REFUND
PARIS, Corinne	85	NO	
VÉZINA, Andrée	99	YES	REFUND
BEAUDRY, Pierre	68	YES	
BOUCHARD, Stephen	85	YES	REFUND
RICHARD, Alexander	86	NO	
LABONTÉ, Danielle	92	YES	REFUND
LAPIERRE, Marcel	59	NO	
BESSETTE, Benoit	15	YES	
DUVAL, Manon	87	YES	REFUND

CONDITION IF / AND	IF RESULTS >=85
AND	STUDENT IN BOARDING SCHOOL AT CAMPUS, COLUMN C = "YES"
THEN	REFUND
OTHERWISE:	NO REFUND ""
ANSWER	=IF(AND(B3>=85;C3="YES");"REFUND";"")

Note:

28. Exercise Condition IF / OR

This exercise can be found in the file "**Formulas step 2**", Sheet **Ex. 3 Cond.**" OR"

SALE OF THE MONTH	JANUARY	CONDITION IF/OR		
Name	SALE OF THE MONTH	EXPERIENCE (YEAR)	COMMISSION (%)	Commission (\$\$)
PARIS, Christine	\$32,000.00	8	10%	\$3,200.00
PARIS, Corinne	\$35,000.00	3	10%	\$3,500.00
VÉZINA, Andrée	\$25,000.00	6	10%	\$2,500.00
BEAUDRY, Pierre	\$42,500.00	7	10%	\$4,250.00
BOUCHARD, Stephen	\$22,500.00	1	5%	\$2,250.00
RICHARD, Alexander	\$35,000.00	8	10%	\$3,500.00
LABONTÉ, Danielle	\$24,600.00	12	10%	\$2,460.00
LAPIERRE, Marcel	\$32,500.00	2	10%	\$3,250.00
BESSETTE, Benoit	\$23,000.00	2	5%	\$2,300.00
DUVAL, Manon	\$4,000.00	1	5%	\$200.00

CONDITION IF/OR	ANSWER IN PERCENTAGE
>=5	=IF(OR(C3>=5 ;B3>=30000);10%;5%)
OR	
>=30,000	ANSWER IN "\$" WITH FORMULA
COMMISSION OF 10%, IF NOT 5%	=IF(OR(C3>5; B3>=30000);B3*10%;B3*5%)

Note:

29. Exercise Pivot Table

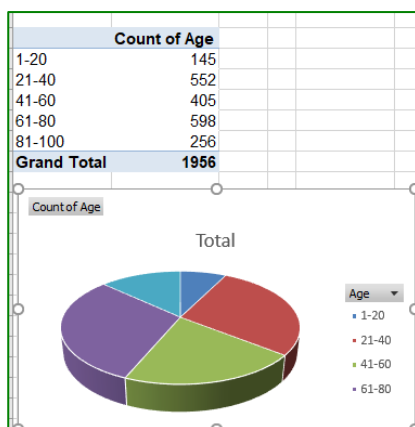
Open the workbook "**Pivot Table**"

1. Pivot Table: sheet: "**Boutique**"

- ▶ What is the total sales per season, view the values in \$
 - ▶ Add the "Category" field in Column Labels
- Expand columns and make sure you keep the column width when updating.


2. Pivot table: sheet: "**Patient**"

- ▶ How many patients per age group (Group of 20)?
- ▶ Rename this sheet: "Age group."
- ▶ Add a chart to your Pivot Table (Pie)



3. What is the number of patients per month, per site?

- ▶ Show "Women" only
- ▶ Do you prefer to see "Site" in rows or columns labels?
- ▶ Hide "**Filed headers**" and adjust all your columns

Gender	W				
Count of Date of appointment					
	HD	ND	SL	Grand Total	
janv		57	93	58	208
févr		85	115	75	275
mars		30	31	13	74
avr		24	24	8	56
mai		15	25	6	46
juin		3	3	1	7
juil		26	27	1	54
août		10	10	1	21
sept			4		4
nov		34	43	34	111
déc		47	62	23	132
Grand Total		331	437	220	988

4. Pivot table: sheet: **"Patient"**

- ▶ What is the number of appointments per **SITE**, by **SPECIALITY** with the names of the doctors? Here's your result, respect the titles and the graphic presentation
- ▶ Do not forget to change your report layout in **"Tabular Form"**
- ▶ Hide "Subtotal" from "Specialty"

Site	Specialty	Doctor's name	Count of Date of appointment
HD	Cardiology	Chang, Lee	91
	Endocrinology	Faulkner, France	22
	General	Beaulieu, Claude	90
		Gaudron, Victoire	104
	Gynecology	Caron, Pierre-Paul	189
	Neurology	Gibson, Anne	28
	Obstetrics		24
	Surgery	Korba, Nicholas	71
	Urology	Garon, Robert	45
HD Total			664
ND	Cardiology	Camejo, Oscar	47
	Endocrinology	Berlin, Jared	18
	General	Adili, Ron	48
		Michaud, Hélène	206
	Gynecology	Price, Lori	285
	Neurology	Ortiz, Francesco	27
	Obstetrics		66
	Surgery	Parulis, Christina	34
	Urology	Weissman, Kimberly	33
ND Total			764
SL	Cardiology	Marchand, Paul	39
	Endocrinology	Bouchard, Étienne	28
	General	Watson, Ana	97
	Gynecology	Drouin, Pierre	118
	Neurology	Barber, Johnny	108
	Obstetrics		20
	Rheumatology	Bertrand, Victoire	24
	Surgery	Papineau, Monika	29
	Urology	Charland, Antoine	65
SL Total			528
Grand Total			1956