



**Course Manual:**

# **Excel Advanced**



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# EXCEL ADVANCED

## 1. Statistical functions (Review)

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

Open the file « **Formulas step 1** », sheet « **Review 1** »

1. Activate cell B8 to get the average of "Session 1"
2. Type =AVERAGE, type parenthesis " ( + the cells containing the results of "Session 1" ) =AVERAGE(B3:B7), the result is "41.25"
3. If you want to get the "Maximum" grade, type "MAX" or for the "Minimum" grade, you will type "MIN"
4. Click OK

### 1.1. Definition of basic functions.

FUNCTIONS	EXPLANATION
SUM	Adds all the numbers in a range of cells.
MAX	Returns the largest value in a set of values. Ignores logical values and text.
MIN	Returns the smallest number in a set of values. Ignores logical values and text.
AVERAGE	Returns the average (arithmetic mean) of its arguments, which can be numbers or names, arrays, or references that contain numbers.
COUNT	Counts the number of cells in a range that contain numbers.
COUNTA	Counts the number of cells in a range that are not empty.

**Note :**

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## 2. RELATIVE OR ABSOLUTE ADDRESSES

### 2.1. Relative address:

- ✖ Whose formula adjusts during a copy.

#### *Example of RELATIVE ADDRESSES:*

Amount	Description	Price	Total
20	Computer	2000	=A2*C2
25	DVD	275	=A3*C3
15	iPad	950	=A4*C4

### 2.2. Absolute address:

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

#### *Example of ABSOLUTES ADDRESSES:*

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

### 2.3. Mixed address:

- ✖ Relative column and absolute line: **B\$2**. Row 2 stays fixed, while the column adjusts when copying. In our case below, by copying the formula to the right, Excel calculates the timelines of each row from the deadlines located only in row 2 for each column.
- ✖ Absolute column and relative row: **\$A3**. Column A remains fixed while the row adjusts when copying. In our case below, by copying the formula down, Excel calculates the timelines of each row from the dates located only in column A.

#### *Example of RELATIVES AND ABSOLUTES ADDRESSES*

Billing Date	DEADLINE 1	DEADLINE 2	DEADLINE 3	DEADLINE 4
	30	60	90	360
2023-09-15	=A3+B\$2	=A3+C\$2	=A3+D\$2	=A3+E\$2
2023-08-21	=A4+B\$2	=A4+C\$2	=A4+D\$2	=A4+E\$2
2023-09-18	=A5+B\$2	=A5+C\$2	=A5+D\$2	=A5+E\$2

### 2.4. 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.

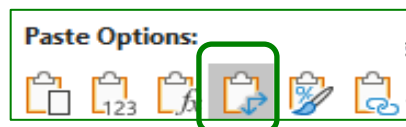
### 3. Transpose: Going from rows to columns

Open the file « *Formulas step 1* », sheet « *Transpose* »

1. Select cells **A2 to M12**
2. 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

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



6. 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. Date function

### 4.1. 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 + ;"

### 4.2. Option 2: Date to be updated

- ✖ We want to **insert a date** that will **be updated** in future use 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()

### 4.3. 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

### 4.4. Function: YEAR – MONTH – DAY

This function is used to retrieve from a date, either year or month or day.

**Open the "Formulas1 Workshop" file, "Employees" sheet**

1. Activate cell "B2" In "Function Library" of the "Formulas" tab,
2. Click on "**DateTime**" Choose either "YEAR OR MONTH"
3. In "**Function arguments**", click on "A2" »

=YEAR(F2)



1	Hiring date	Month or Year	Number	hours	Hour rate	Salary week
2	2012-10-05	=YEAR(F2)	20	23.50	\$	
3	2016-11-18					
4	2018-06-07					
5	2022-04-09					
6	2022-09-12					
7	2022-11-12					

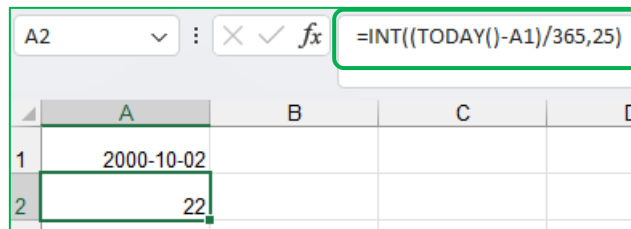
  

1	Hiring date	Month or Year
2	2012-10-05	2012
3	2016-11-18	2016
4	2018-06-07	2018
5	2022-04-09	2022
6	2022-09-12	2022
7	2022-11-12	2022

## 5. Formulas: INT

This "INT" formula represents rounding down one number to the nearest integer. This function is equivalent to "ROUNDED. INF" (Integer 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. Parenthesis for "(TODAY() AND A1) " then divide by 365.25
5. This person will be 23 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 22
9. Tomorrow, your result SHOULD BE 23
10. To save a step: in cell A2, type the following formula:



*Here is an example with the month and day "Today" but born in "2000"*

If necessary, open the " **Formulas Step 1**", "**TODAY\_NOW**" sheet.

1. In cell C2, type the following formula: TODAY() which represents today's date (DYNAMIC DATE)
2. In cell C3, type the following formula: NOW() which represents the date and time of the day.
3. In cell "C5",

- ✖ Enter the year 2000.
- ✖ The current month
- ✖ The day of "Tomorrow"

- ✖ In cell "C6," enter the following formula:
- ✖ TODAY () MINUS HIS DATE OF BIRTH

=TODAY()-C5	Age in days	8399
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- ✖ Cell "C7", in parentheses "(C2 or TODAY() – C5)", then divide by 365.25

=(TODAY()-C5)/365,25	Age in years	22,99520876
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- ✖ Cell "C8", you must obtain the integer value with the function "INT"
- ✖ Or you type = INT and click in cell C7, close parenthesis
- ✖ Or Add "INT" immediately after "=", we have opened a parenthesis, so we must close it at the end of the formula.

=INT((TODAY()-C5)/365,25)

- ✖ In cell "C5", replace the day for today's According to our calculations, age should have an additional value  
We add +1 like this:

2000-10-02	23	=INT((TODAY()-E3+1)/365,25)	AGE WITH "INT" - GOOD <input checked="" type="checkbox"/>
------------	----	-----------------------------	---

*Now let's see the other formulas for age calculation  
Look at the dates that are in column "E to H"*

Anniversary date	AGE	FORMULA	DESCRIPTION
2000-10-02	23	=INT(YEARFRAC(E2;TODAY()))	AGE FRACTION - GOOD <input checked="" type="checkbox"/>
2000-10-02	23	=INT((TODAY()-E3+1)/365,25)	AGE WITH "INT" - GOOD <input checked="" type="checkbox"/> 
2000-10-02	22	=INT((TODAY()-E4)/365,25) For Excel, the age will be change after the end of the day	FORMULA USED - NOT GOOD if we don't take time into account <input checked="" type="checkbox"/>
2000-10-02	23	=DATEDIF(E5;TODAY();"y")	AGE WITH "DATEDIF" Very GOOD but not in the formulas "DATE" <input checked="" type="checkbox"/>

## 6. NETWORKDAYS

This formula calculates the number of days between two dates, considering Saturday, Sunday, and holidays.

**Open Formulas Step 1, NETWORKDAYS sheet**

- ✖ Cell « C2 »
- ✖ In "Function Library", Book "Date & Tim", choose "NETWORKDAYS"
- ✖ Select A2 for "Start\_date"
- ✖ Then B2 for "End\_date"
- ✖ Select A8 to A10 (All your holidays)

- ✖ Touch F4 to lock cells.
- ✖ The result is: 16
- ✖ Representing number of days without **Saturday and Sunday and holidays**

Function Arguments

NETWORKDAYS

Start\_date A2 = 45240

End\_date B2 = 45261

Holidays \$A\$8:\$A\$10 = {45241;45285;45292}

= 16

Returns the number of whole workdays between two dates.

**Holidays** is an optional set of one or more serial date numbers to exclude from the calculation, such as state and federal holidays and floating holidays.

## 7. SUMIF

This function allows you to make the sum of a range according to a criteria.

This criteria 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 criteria will be applied, it can be the same as "sum\_range"

- ✖ Type these data in a sheet

	A	B
1	Emergency	22
2	Surgery	11
3	Emergency	55
4	Medicine	10
5	Surgery	33
6	Surgery	45

- ✖ Criteria must be in the form of a number, text, or expression of comparison. **This criteria 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 criteria, if so, it adds the value of the X cell to the result. **Example:**

**Sum of the set**  
**Answer: 176**

**SUMIF**  
**Condition: Surgery**  
**Answer: 89**

	A	B	C	D	E	F	G
1	Emergency	22					
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							

Function Arguments

SUMIF

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

Criteria "Surgery" = "Surgery"

Sum\_range B1:B6 = {22;11;55;10;33;45}

= 89

Adds the cells specified by a given condition or criteria.

Range is the range of cells you want evaluated.

Formula result = 89

[Help on this function](#)

OK

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

## 8. COUNTIF

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

- ✖ Criteria must be in the form of a number, a text, or an expression of comparison. These criteria 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 corresponds to the condition indicated in the criteria, it adds 1 to the result.

### Example: COUNTIF

- ✖ In the previous table, how many lines contain the word "surgery"
- ✖ In cell B9, type = COUNTIF(
- ✖ In **Range**, choose A1 to A6
- ✖ **Criteria**: Type: "Surgery"

	A	B	C	D	E	F	G
1	Emergency	22	<div>Function Arguments</div> <div>COUNTIF</div> <div>Range: A1:A6 = {"Emergency";"Surgery";"Emergency";"Medicine";"Surgery";"Surgery"}</div> <div>Criteria: "Surgery" = "Surgery"</div> <div>Counts the number of cells within a range that meet the given condition.</div> <div>Range is the range of cells from which you want to count nonblank cells.</div> <div>Formula result = 3</div>				
2	Surgery	11					
3	Emergency	55					
4	Medicine	10					
5	Surgery	33					
6	Surgery	45					
7							
8	SUMIF: SURGERY	89					
9	COUNTIF	"Surgery")					

- ✖ =COUNTIF(A1:A6;"Surgery") = 3

## 9. 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.

### Example: "LARGE"

In the previous table, what is the largest value in column B  
=LARGE(B:B;1)= 55 ("K1" represent "the greatest value")

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

	A	B	C	D	E	F	G
1	Emergency	22	<div>Function Arguments</div> <div>LARGE</div> <div>Array: B1:B6 = {22;11;55;10;33;45}</div> <div>K: 1 = 1</div> <div>Returns the k-th largest value in a data set. For example, the fifth largest number.</div> <div>Array is the array or range of data for which you want to determine the k-th largest value.</div> <div>Formula result = 55</div> <div>Help on this function</div> <div>OK Cancel</div>				
2	Surgery	11					
3	Emergency	55					
4	Medicine	10					
5	Surgery	33					
6	Surgery	45					
7							
8	SUMIF: SURGERY	89					
9	COUNTIF	3					

In the previous table, what is the smallest value in column B  
=SMALL(B:B;1)= 10

## 10. 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 \$

### 10.1. Some 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.

## 11. Function IF

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

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

IF (A2>40000)	A2*5%	0 or ""
[logical_test]	[value_if_true]	[value_if_false]

The screenshot shows an Excel spreadsheet with columns A and B. Column A is labeled 'Amount sale' and column B is labeled 'Bonus'. The data in column A is: 48 000,00\$, 40 500,00\$, 45 000,00\$, 38 000,00\$, 37 500,00\$. The data in column B is: 2 025,00 \$, 2 250,00 \$, -, -. The formula in cell B2 is =IF(A2>40000;A2\*5%;0). To the right, the 'Function Arguments' dialog for the IF function is open. It shows: Logical\_test: A2>40000, Value\_if\_true: A2\*5%, Value\_if\_false: 0. The formula result is 2 400,00 \$.

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

### Example: IF

Open "Formulas Step 1", "Statistics" sheet

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

- ✖ Click on cell E2.
- ✖ Type =IF(
- ✖ Click in B2. Type <> (these 2 signs together mean not)
- ✖ Text Montreal under quote [logical\_test] B2<>"Montreal"
- ✖ Coma or semicolon
- ✖ [value\_if\_true] type "YES"
- ✖ [value\_if\_false] type "NO"
- ✖ Close parenthesis

The screenshot shows the Excel formula bar with the formula =IF(B2<>"Montreal";"YES";"NO"). Below the formula bar, the data table is shown with columns A, B, C, D, and E. Column A is labeled 'Name', column B is labeled 'Head offi', column C is labeled 'Post', column D is labeled 'Amount sale', and column E is labeled 'Expenses account'. The data in column A is: Allaire, Sylvain, Allard, Cosette, Allard, Marie. The data in column B is: Sherbrooke, Sherbrooke, Montreal. The data in column C is: President, Vice-President, President. The data in column D is: 48 000,00\$, 40 500,00\$, 45 000,00\$. The data in column E is: YES, YES, NO.

## 12. 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 must 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

## 13. 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.

### Examples of formula: IF & "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 \$

## 14. 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")

You can use this formula also:

=IF(G26="";"UNPAID";"PAID")

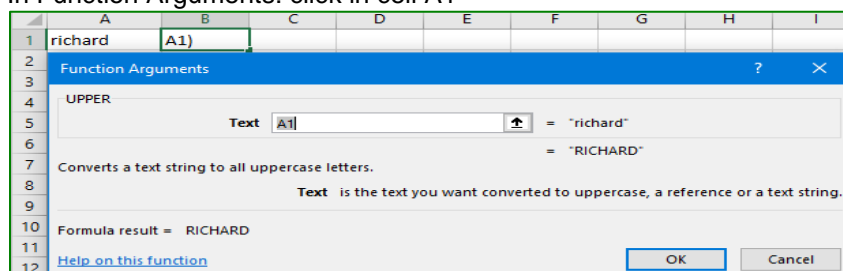
F	G
BILLING TRACKING	PAYMENT RECEIVED
PAID	2020-10-05
PAID	2020-10-25
UNPAID	
PAID	2020-10-20
UNPAID	
PAID	2020-11-14
UNPAID	
UNPAID	

## 15. TEXT FUNCTION

### 15.1. 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



## 15.2. 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 must 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.*

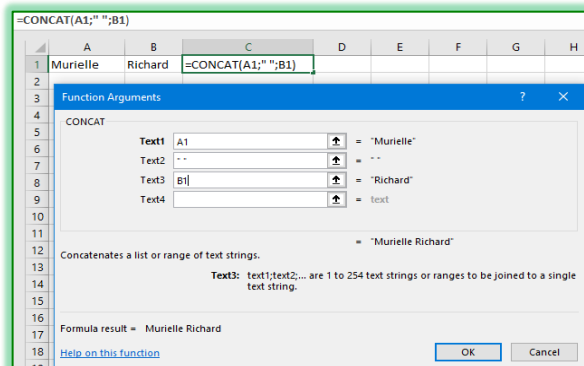
## 15.3. CONCAT

*Union of 2 or 3 columns in a single cell*

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

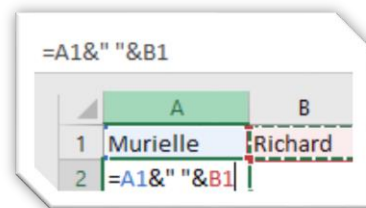
### 15.3.1. First method

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



### 15.3.2. Second method

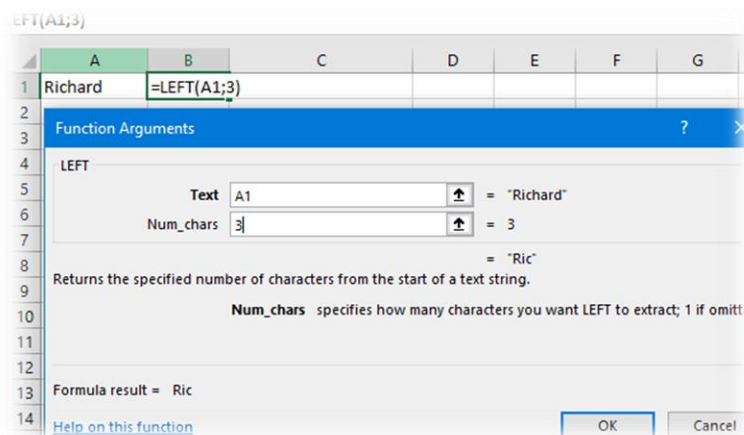
1. Type your first name in cell A1 and your last name in cell B1
2. In A2, type =
3. Click in cell A1
4. Type & (located above number 7)
5. To insert a space between your first and last name, type " " (quotation marks, space, quotation marks)
6. Retype &
7. Click in cell B1 then enter
8. Here is the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



### 15.4. 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**

## 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	D	E	F
1	Francine Thibault	BISTRO DES BIÈRES BELGES	7886 rue San Francisco	Boucherville	QC	J3T 4R8
2	Céline Marcoux	RESTAURANT LOU NISSARD	260 Rue Saint-Jean	Longueuil	QC	J4H 2X5
3	France Barbeau	BOSTON PIZZA	9534 rue Belleville	Boucherville	QC	J3P 7V5
4	Cosette Allard	BISTRO ST-JACQUES	6710 Rue Saint-Jacques	Montréal	QC	H4B 1V8
5	Joe Bloe	PIZZA HUT	3 Rue Papineau	Joliette	QC	J6E 9A1

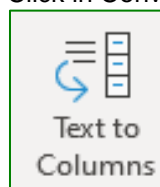
## 17. Convert

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	D	E	
1	Francine Thibault, CL06-001, BISTRO DES BIÈRES BELGES, 7886 rue San Francisco, Boucherville, QC, J3T 4R8					
2	Céline Marcoux, CL06-002, RESTAURANT LOU NISSARD, 260 Rue Saint-Jean, Longueuil, QC, J4H 2X5					
3	France Barbeau, CL06-003, BOSTON PIZZA, 9534 rue Belleville, Boucherville, QC, J3P 7V5					
4	Cosette Allard, CL06-004, BISTRO ST-JACQUES, 6710 Rue Saint-Jacques, Montréal, QC, H4B 1V8					
5	Joe Bloe, CL06-005, PIZZA HUT, 3 Rue Papineau, Joliette, QC, J6E 9A1					

### 17.1. Convert text

- ✦ Select A1 to A5
- ✦ From the Data tab
- ✦ Click in Convert (Text to Columns)



✖ Choose **Delimited** in **Step 1 of 3**

Convert Text to Columns Wizard - Step 1 of 3

The Text Wizard has determined that your data is Fixed Width.  
If this is correct, choose Next, or choose the data type that best describes your data.

Original data type

Choose the file type that best describes your data:

☒ Delimited - Characters such as commas or tabs separate each field.  
☐ Fixed width - Fields are aligned in columns with spaces between each field.

Preview of selected data:

```
1 Francine Thibault, CL06-001, BISTRO DES BIÈRES BELGES, 7886 rue San Francisco, Boucherville, QC
2 Céline Marcoux, CL06-002, RESTAURANT LOU NISSARD, 260 Rue Saint-Jean, Longueuil, QC
3 France Barbeau, CL06-003, BOSTON PIZZA, 9534 rue Belleville, Boucherville, QC, J3P 7V5
4 Cosette Allard, CL06-004, BISTRO ST-JACQUES, 6710 Rue Saint-Jacques, Montréal, QC, H4B 1V8
5 Joe Bloie, CL06-005, PIZZA HUT, 3 Rue Papineau, Joliette, QC, J6E 9A1
6
```

Cancel < Back **Next >** Finish

✖ **Next >** (**Step 2 of 3**)

✖ Choose the **comma**.

✖ View the result in the **Data preview**.

✖ Click **Finish**

Convert Text to Columns Wizard - Step 2 of 3

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters

☒ Tab  
☐ Semicolon  
☒ Comma  
☐ Space  
☐ Other:

☐ Treat consecutive delimiters as one

Text qualifier:

Data preview

Francine Thibault	CL06-001	BISTRO DES BIÈRES BELGES	7886 rue San Francisco	Boucherville	QC	J3T 4R8
Céline Marcoux	CL06-002	RESTAURANT LOU NISSARD	260 Rue Saint-Jean	Longueuil	QC	J4H 2X5
France Barbeau	CL06-003	BOSTON PIZZA	9534 rue Belleville	Boucherville	QC	J3P 7V5
Cosette Allard	CL06-004	BISTRO ST-JACQUES	6710 Rue Saint-Jacques	Montréal	QC	H4B 1V8
Joe Bloie	CL06-005	PIZZA HUT	3 Rue Papineau	Joliette	QC	J6E 9A1

Cancel < Back **Next >** Finish

✖ **Result**

	A	B	C	D	E	F
1	Francine Thibault	BISTRO DES BIÈRES BELGES	7886 rue San Francisco	Boucherville	QC	J3T 4R8
2	Céline Marcoux	RESTAURANT LOU NISSARD	260 Rue Saint-Jean	Longueuil	QC	J4H 2X5
3	France Barbeau	BOSTON PIZZA	9534 rue Belleville	Boucherville	QC	J3P 7V5
4	Cosette Allard	BISTRO ST-JACQUES	6710 Rue Saint-Jacques	Montréal	QC	H4B 1V8
5	Joe Bloie	PIZZA HUT	3 Rue Papineau	Joliette	QC	J6E 9A1

## 17.2. Convert to Fixed Width

*Our goal will be to separate the first two letters and numbers; however, we must keep the zeros.*

8	<b>Separate the letters from the numbers but keep the "ZERO"</b>			
9	AW02345			
10	MY00345			
11	LI8346			

Original data type

Choose the file type that best describes your data:

☐ Delimited - Characters such as commas or tabs separate each field.

☒ Fixed width - Fields are aligned in columns with spaces between each field.

- ✖ Select from A8 to A10
- ✖ From **DATA**, **Text to columns**
- ✖ In "Convert Text...", choose "**Fixed Width**" Go to "**Next.**"
- ✖ Click between letters and numbers

Convert Text to Columns Wizard - Step 2 of 3

This screen lets you set field widths (column breaks).  
Lines with arrows signify a column break.

To CREATE a break line, click at the desired position.  
To DELETE a break line, double click on the line.  
To MOVE a break line, click and drag it.

- ✖ Next >
  - ✖ First column remains **General**.
  - ✖ Second column, change **General for Text**
- Finish**

Convert Text to Columns Wizard - Step 3 of 3

This screen lets you select each column and set the Data Format.

Column data format

☐ General

☒ Text

☐ Date: YMD

☐ Do not import column (skip)

Advanced...

Destination: \$A\$9

Data preview

Text

AW02345

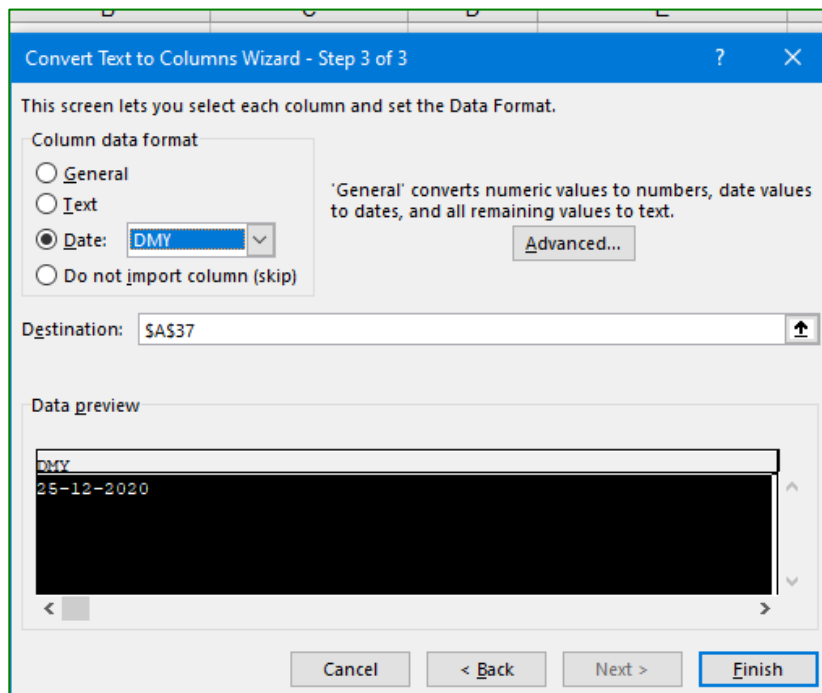
MY00345

LI8346

9	AW	02345
10	MY	00345
11	LI	8346

### 17.3. Convert dates stored as text to turn it into date format

1. Type a date like this: (DD-MM-YYYY), 25-12-2023
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**



### Note

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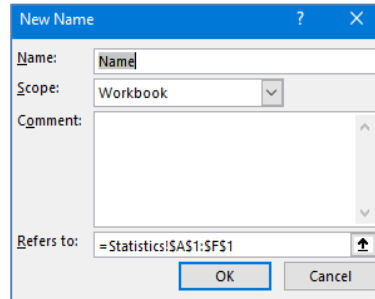
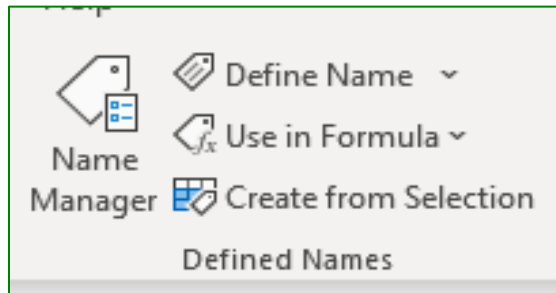
---

## 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.

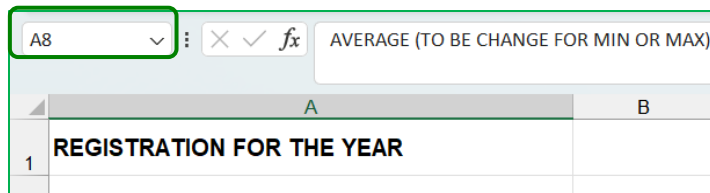
After selecting the range to be named, use

**Formulas tab » Define name**



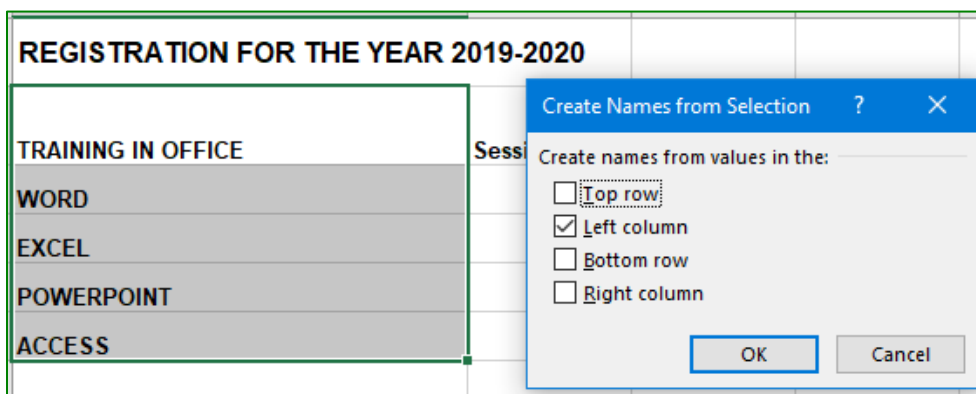
OR

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



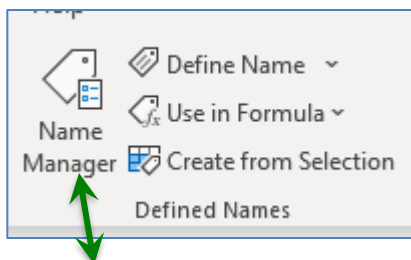
- ✦ To name a cell or cell range:
- ✦ Select a cell or range of cells you want to name.
- ✦ Click in the Name area, to the left of the formula bar.
- ✦ Enter a name that will serve as a reference for the cell. Validate by pressing the Enter button.

### 18.1. 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 considered, 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.

### 18.2. Open the Name Manager dialog box

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



- ✖ Show names

### 18.3. 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**.

	Février	B	C	D	E
	Janvier				
	Mars				
1					
2					
3					
4					
5					
6					

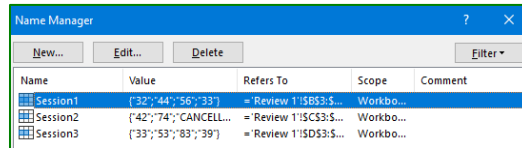
### 18.4. Use a range name in a function

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

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			

## 18.5. 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



## 19. 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.

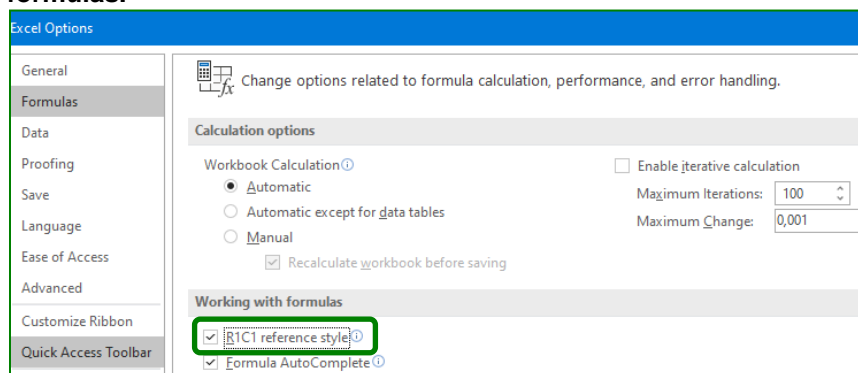
### Dialog box "FUNCTION ARGUMENT"

#### VLOOKUP

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

### 19.1. How to change the columns display to numbers

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



## 19.2. EXERCISE VLOOKUP

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

**Open the file "Travel\_VLookUp"**

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

	A	B	C	D	E
	CUSTOMER	Gender			
1	(1)	(2)	CUSTOMER (3)	D.O.B. (4)	Age (5)
2	VS-1255	M	Claude Patry	2013-04-11	10
3	VS-1444	M	Peter Schweitzer	2012-02-22	11
4	VS-1457	M	Pierre-Luc Brisson	2011-08-17	12
5	VS-1496	M	Tony Gingras	2011-08-26	12
6	VS-1212	W	Ann Clyde	2009-11-23	13
7	VS-1227	M	Bernard Pierrot	2009-11-16	13
8	VS-1326	M	Joël Hanna	2009-11-23	13

2. From the **Formulas** tab **Define Name** type **"Customer"** in **New Name**
3. Also give a name from sheet **"Travel"** Example **"City"**

The 'New Name' dialog box shows the following fields:

- Name: Customer
- Scope: Workbook
- Comment: (empty)
- Refers to: =Customer!\$A\$1:\$J\$308

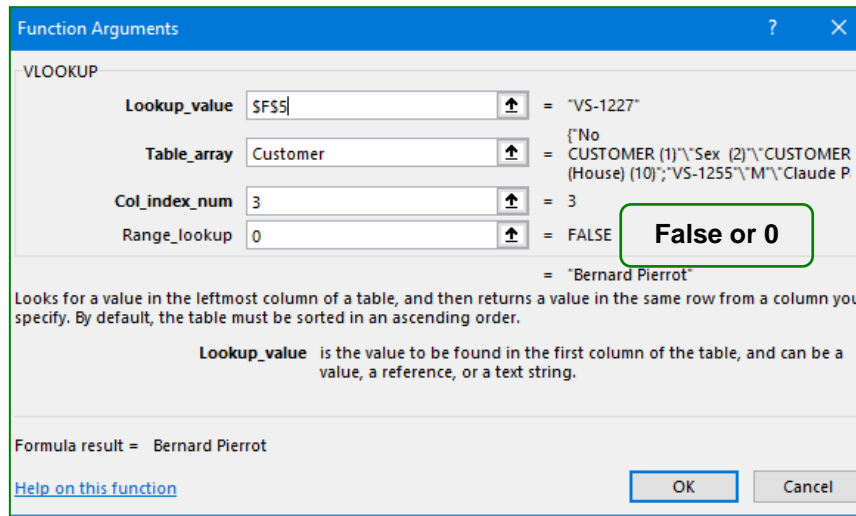
The 'New Name' dialog box shows the following fields:

- Name: City
- Scope: Workbook
- Comment: (empty)
- Refers to: =City!\$A\$1:\$B\$12

4. Return to sheet **"Invoice"**, click in cell **B5** to search for the customer's name **"VS-1227"**.
5. Click **Lookup & Reference** **Formula Tab**, choose **VLOOKUP**

VLOOKUP

6. You are now in the **"Function Arguments" dialog box**.
7. **Lookup\_value** is the **"VS-1227"** customer number, so you need to **click** cell **F5**, which represents the desired value
8. **Table\_array**: Enter the name of the table **"Customer"**
9. **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"**
10. **Range\_lookup**: type **FALSE** or **value 0**



11. Click OK
12. Answer: =VLOOKUP(F5;Customer;3;False)
13. To save time ► Lock F5 ► \$F\$5
14. Repeat the same steps to search for the address, and contacts.
15. See the table on the next page for column number identification.
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.

=IF(ISBLANK(A10);"";VLOOKUP(A10;City;2;0))

## 20. Function HLOOKUP

**Definition of HLOOKUP:** Finds a value in the top row of a table, and then returns a value in the same column from a specific row.

*Our goal is to "GET A DISCOUNT BASED ON THE COST OF THE TRIP"*

1. To save time, open the workbook "Invoice - Answer " sheet.
2. Please delete the answer in cell "F16"
3. **Objective:** redo the formula **HLOOKUP**
4. In cell "F16" activate "HLOOKUP"
5. "Lookup\_value" is "F15"
6. "Table\_array" select the "DISCOUNTS - FEES" sheet, cell from "A2 to F3".
7. "Row\_index\_num", enter the number "2".

8. "Range\_lookup", enter the number "1"

Function Arguments

HLOOKUP

Lookup\_value: F15 = 2775

Table\_array: 'DISCOUNTS - FEES'!A2:F3 = ('Amount Purchases'\0\200\1000\2500\5000;'D...

Row\_index\_num: 2 = 2

Range\_lookup: 1 = TRUE

Looks for a value in the top row of a table or array of values and returns the value in the same column from a row you specify.

Lookup\_value is the value to be found in the first row of the table and can be a value, a reference, or a text string.

Formula result = 555,00 \$

Help on this function

OK Cancel

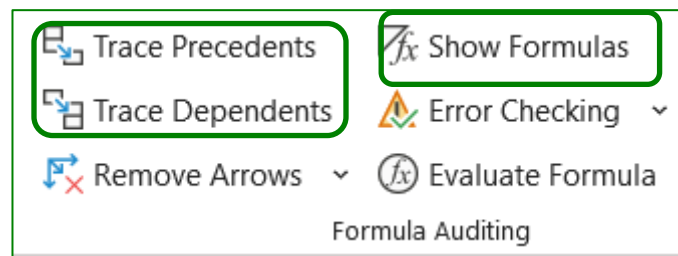
9. Answer is "0,2" – 20% discount, then multiply by "F15"

=HLOOKUP(F15;'DISCOUNTS - FEES'!A2:F3;2;1)\*F15

Amount Purchases	0	200	1000	2500	5000
Discount	0%	5%	15%	20%	25%

## 21. 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**



### 21.1. To view and print formulas

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

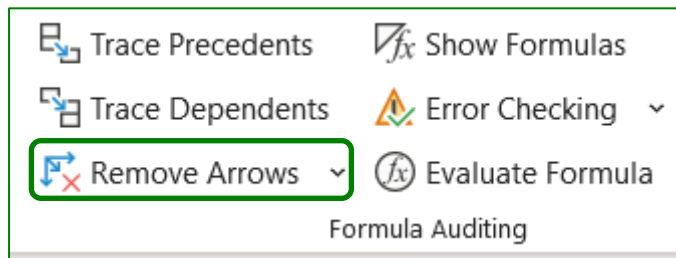
1. Click the **formulas** tab → Formula Auditing → **Show Formulas**.
2. Check the **preview** before you print: your table should fit on a single page

## 21.2. 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.

## 21.3. To remove audit arrows:

- ✖ Click the **Formulas** tab → **Remove Arrows**



## 22. Pivot Table

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.

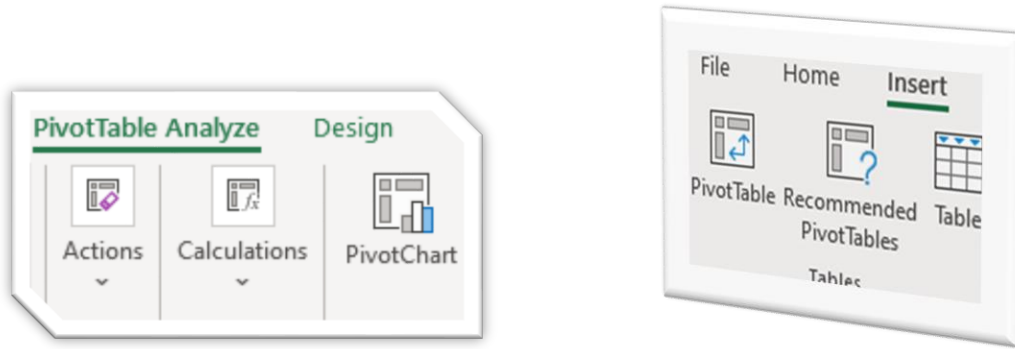
Each column header in the database becomes a pivot table field. Each next row corresponds to a record.

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.

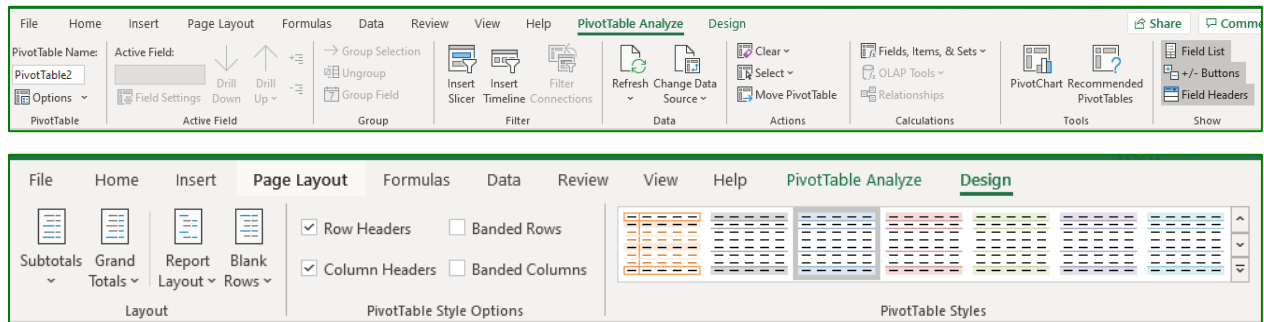
*The effectiveness of a pivot table is based on a properly structured database.*

**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)



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

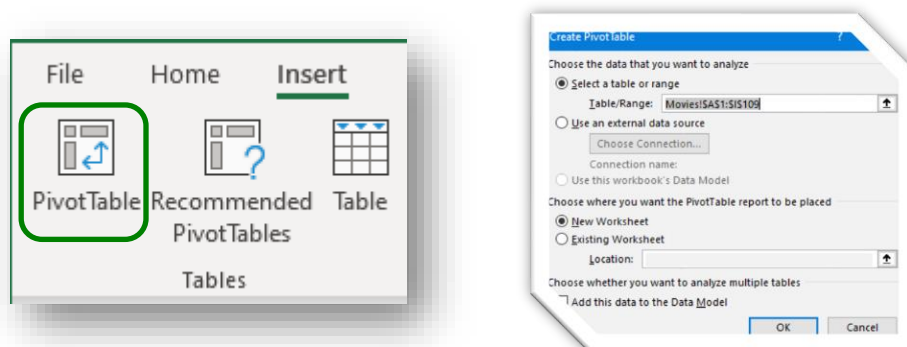


The pivot table command is very useful when you need to filter multiple fields from the same list (database). This command creates a table that calculates values using a synthesis function, such as "Sum", "Average", and other...

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:

## 22.1. Start the PIVOT TABLE

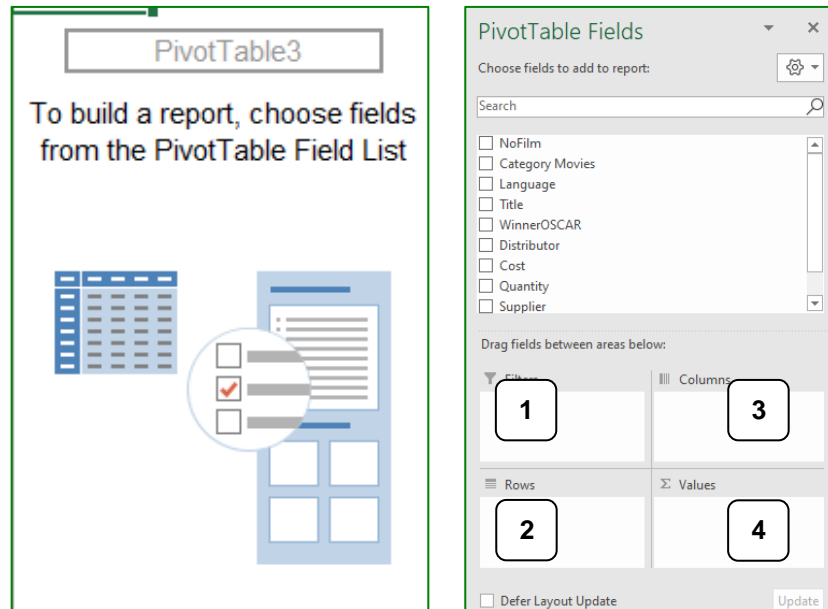
1. Select a **single cell** from the database
2. From the **Insert** tab **Click Pivot Table**



3. Select data to be analyzed as needed
4. Or use another external data source

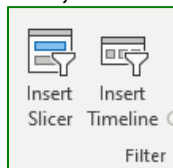
5. Determine where you want Excel to display your pivot table
  - ✖ In a new sheet or an existing sheet
6. Click ► **OK**

## 22.2. ELEMENTS OF A PIVOT TABLE



### 22.2.1. 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 considered 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.

### 22.2.2. Rows

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

### 22.2.3. Columns

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

### 22.2.4. Data field or Values

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

Filters

Column field

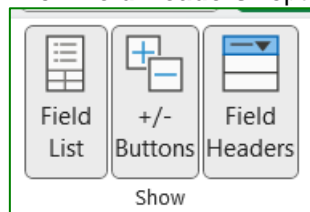
WinnerOSCAR	(All)									
Sum of Quantity	Category	Movies								
Language	Distributor	Action	Adult	Cartoons	Comedy	General	Horror	Tragedy	Grand Total	
E	Alliance					64			89	153
	Columbia Pictures	75					64	152	291	
	Fox Video	75		75	64		89	77	380	
	Paramount Pictures	89						174	263	
	Universal Pictures	91			76			77	244	
	Walt Disney							271	271	
	Warner Bros.	64							64	
<b>E Total</b>		<b>394</b>		<b>75</b>	<b>204</b>		<b>153</b>	<b>840</b>	<b>1666</b>	
F	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	173	307	922	
	Paramount Pictures	182			341	200	115	455	1293	
	Universal Pictures	98		71	83		86	81	419	
	Walt Disney	286		75	75	263	75	467	1241	
	Warner Bros.	237			83	89	99	442	950	
<b>F Total</b>		<b>1641</b>	<b>231</b>	<b>326</b>	<b>978</b>	<b>1095</b>	<b>548</b>	<b>2582</b>	<b>7401</b>	
<b>Grand Total</b>		<b>2035</b>	<b>231</b>	<b>401</b>	<b>1182</b>	<b>1095</b>	<b>701</b>	<b>3422</b>	<b>9067</b>	

Row field

Data field

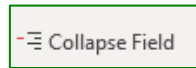
### 22.3. View and hide

- ✖ 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.

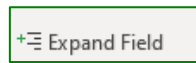


## 22.4. Active field

- ✖ 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**.

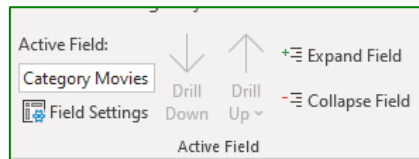


To hide the details

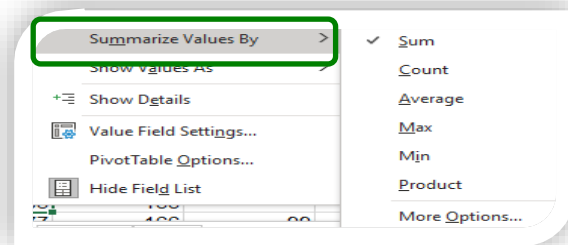
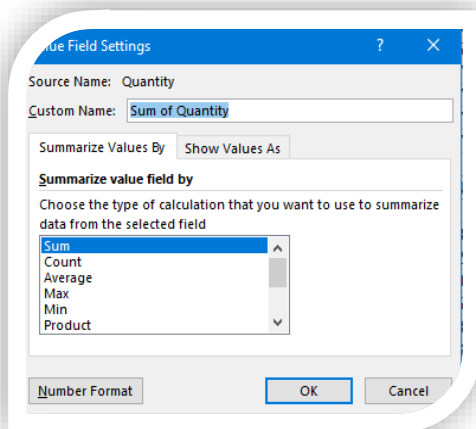


To view more details

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



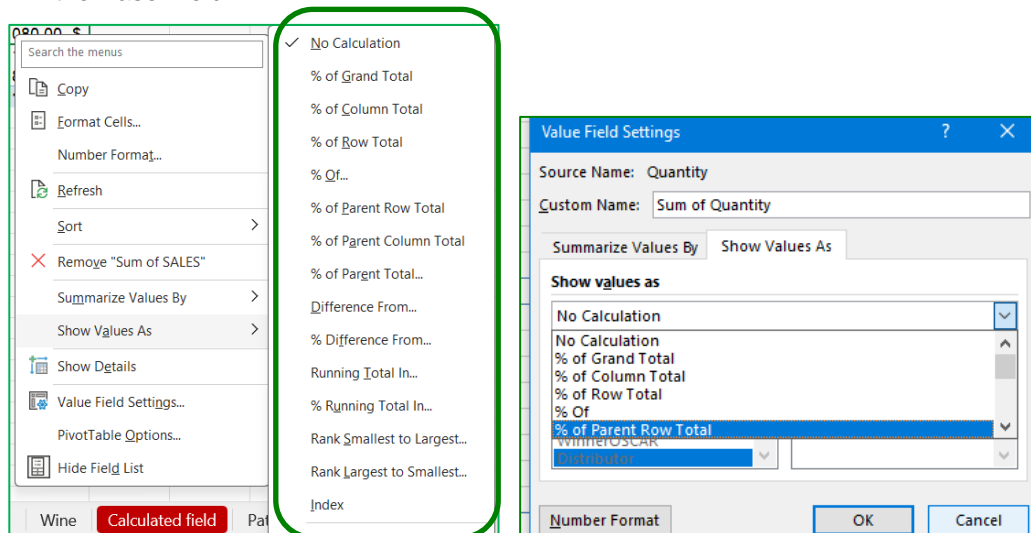
### 22.4.1. Field settings – Summarize Values - Common operations



- ✖ **"Sum"** returns the sum of all the values of the field.
- ✖ **"Count"** returns the number of records in the field.
- ✖ **"Average"** returns the average of all the values in this field.
- ✖ **"Max"** returns the highest value of the field.
- ✖ **"Min"** returns the smallest value of the field.
- ✖ **"Product"** multiplies all the values of the field.
- ✖ **"Count Numbers"** returns the number of digital records in the field.
- ✖ **"StdDev"** returns the standard deviation of the field.
- ✖ **"StdDevp"** returns the standard deviation of a population.
- ✖ **"Var"** returns the variance of the field.
- ✖ **"Varp"** returns the variance of a population.

## 22.5. Field settings – Show values

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



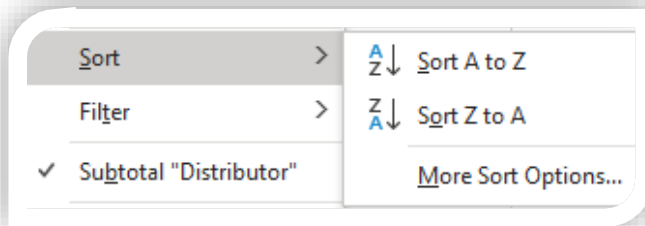
**The "Field Settings" window also contains other information and options:**

- ✦ The name of the source field.
- ✦ **The custom name** that appears in the report and that is changeable.
- ✦ 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.

## 22.6. 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.

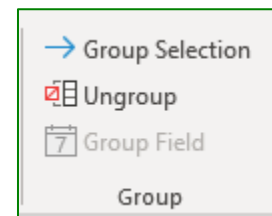
We will get this option with the right click mouse button.



## 22.7. Group Selection

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

- ✦ 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.
- ✦ The **"Ungroup"** allows you to delete the selected group.
- ✦ 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	Count of Age
20-29	5
30-39	17
40-49	18
50-59	5
<b>Grand Total</b>	<b>45</b>

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 \$
<b>Grand Total</b>	<b>157 385,75 \$</b>

**Grouping** ? X

Auto

☐ Starting at: 0

☒ Ending at: 59

By: 10

OK Cancel

**Grouping** ? X

Auto

☒ Starting at: 2008-03-21

☒ Ending at: 2020-10-27

By:

Seconds  
Minutes  
Hours  
Days  
Months  
Quarters  
Years

Number of days: 1

OK Cancel

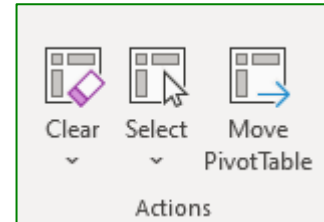
- ✦ The pivot table then returns the elements grouped according to the chosen element:
- ✦ You can select multiple group options at the same time. Click the **"Ungroup"** button to remove groups.
- ✦ Numerical elements can be grouped in the same way. Example for grouping values by ten:

## 22.8. Actions

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

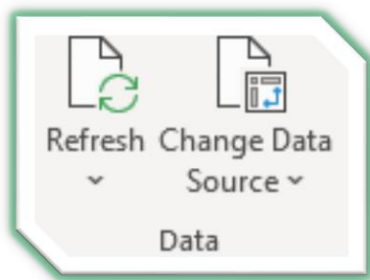
The **"Select"** button allows you to quickly activate certain cells in the report:

- ✦ Labels and values.
- ✦ Labels alone.
- ✦ Values alone.
- ✦ 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.

## 22.9. Data group



### 22.9.1. Refresh data

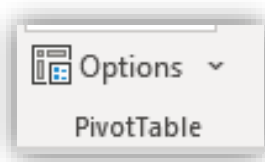
- ✦ **It is important to always refresh the data when you're working**

### 22.9.2. Change the data source

- ✦ **Also, make sure the pivot table includes all the new data**

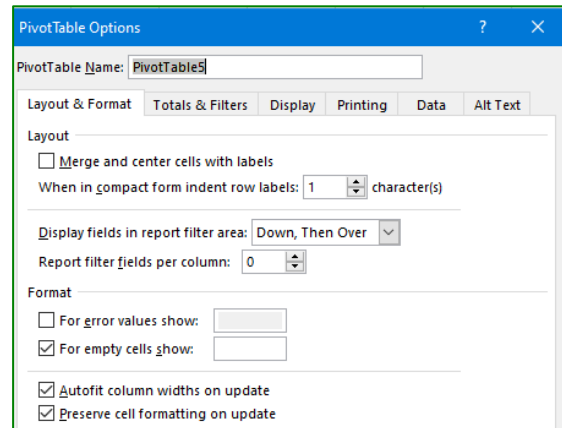
## 22.10. Pivot table options

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



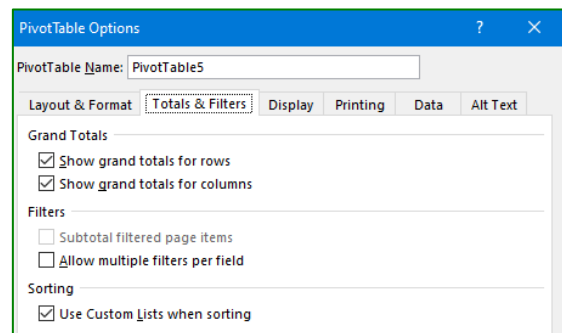
## "Layout & Format" tab

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



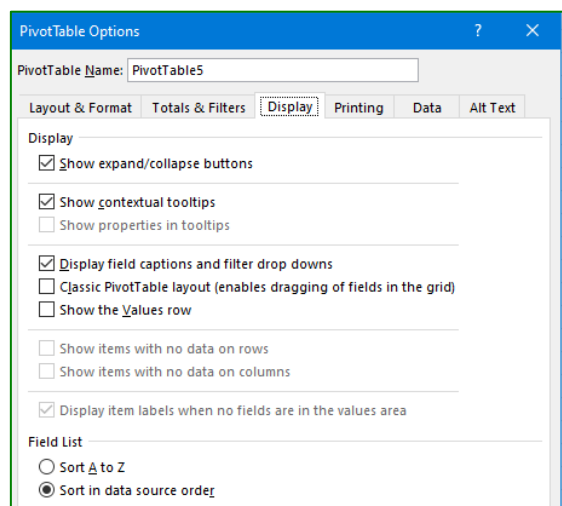
## The "Totals and Filters" tab

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



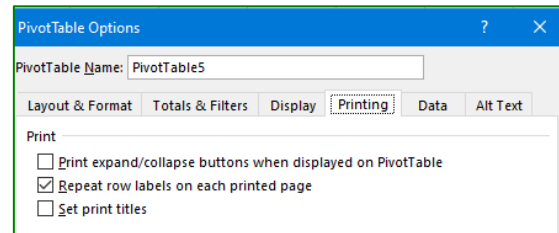
## The "Display" tab

- ✦ Shows or hides expand/collapse buttons
- ✦ 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.
- ✦ The "Classic layout" option allows you to drag/drop.
- ✦ Shows or hides line items that do not contain value.



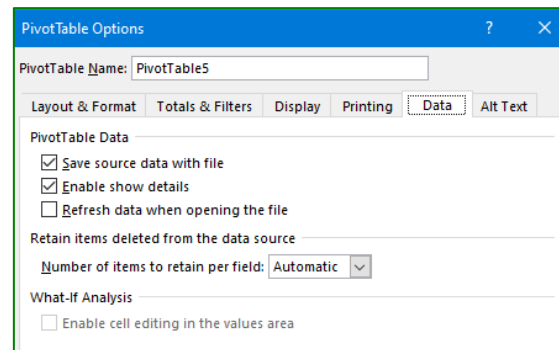
## The "Printing" tab

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



## The "Data" tab

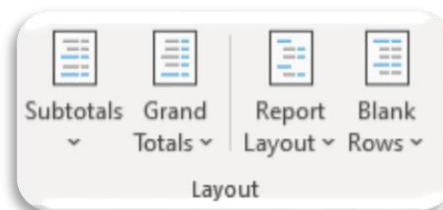
- ✦ The "Save source data with file" option backs up data from the external source with the workbook.
- ✦ "Enable show details" to extract and view data detail in a new spreadsheet.
- ✦ Refresh data when opening the file.



## 22.11. Design tab

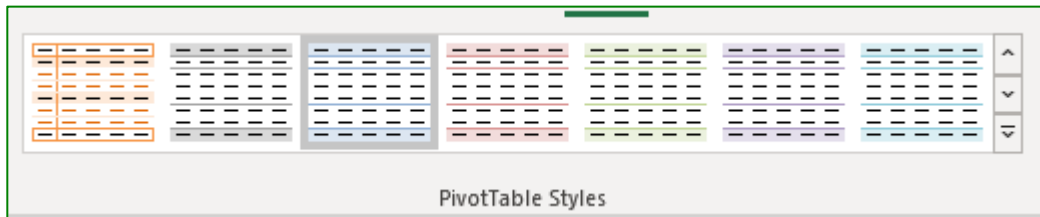
### Layout

- ✦ 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.
- ✦ 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.
- ✦ 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.
- ✦ 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.

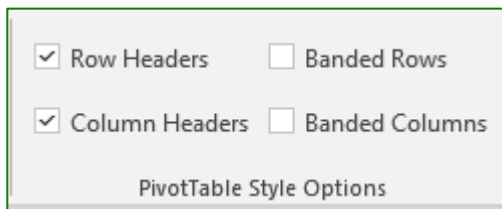


## Style

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



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



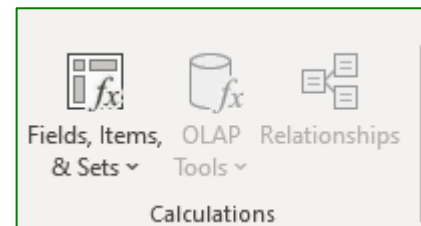
- ✖ This option allows you to choose a style of presentation from a wide range of predefined formats.
- ✖ Click in the lower right corner of the drop-down menu to see the different styles. You can also remove a style from the list or add a custom style. A custom style can be defined as the quick style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

## 22.12. Calculations

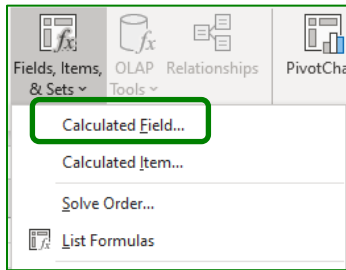
### Calculated fields

If the predefined formulas are not enough to summarize the value fields, you can 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 to change or delete it.



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



1. Open **"Pivot Table"** » Workbook » **"Supermarket"** sheet
2. **Create a Pivot Table**
3. Insert **"Products"** in row label and **"TotalSales"** to **"Values"**
4. Choose **"Calculated Field"** » Group Calculations
5. Name: type **"Taxes"**
6. Formulas: **= TotalSales\*14.975%**
7. **Click OK**
8. See your result

	A	B	C	D	E	F
1						
2						
3	Row Labels	Sum of TotalSales	Sum of Taxes			
4	Fine herbs	6 215,84 \$	930,82 \$			
5	Fruits	6 752,20 \$	1 011,14 \$			
6	Vegetables	15 497,20 \$	2 320,71 \$			
7	<b>Grand Total</b>	<b>28 465,24 \$</b>	<b>4 262,67 \$</b>			
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Insert Calculated Field

Name: Taxes

Formula: ='TotalSales' \*14,975%

Fields:

- Invoice number
- Products
- Category
- Farm
- Amount sold (kg)
- Unit price
- TotalSales
- Taxes

Insert Field

OK Close

Note:

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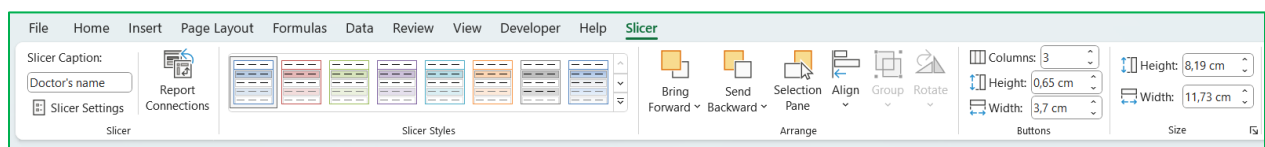
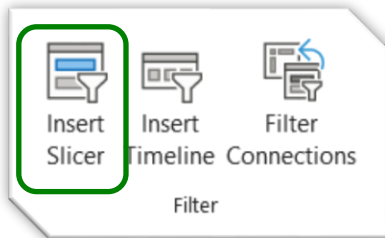
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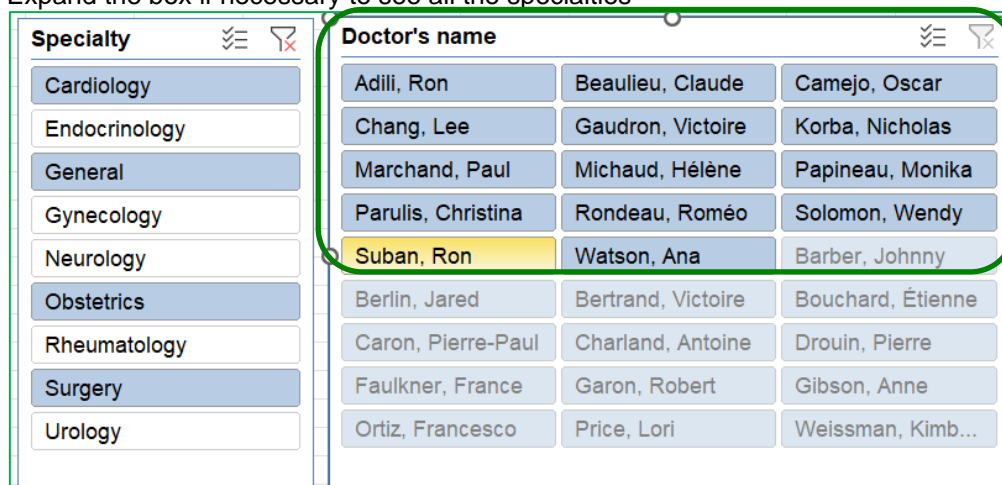
## 22.13. Insert Slicer

A **Slicer** is a filter, instead of using the "**Filter**" field, we'll use "**Insert Slicer**" because we have multiple elements. The "**SLICER**" is very visual and interesting.



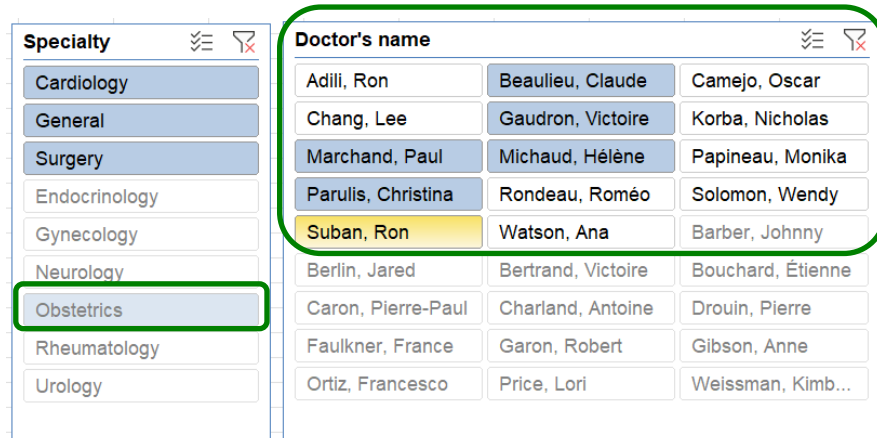
*Let's take the example of the "Patient" sheet of the "Pivot Table" Workbook  
You would like to know the number of appointments per site*

- ✖ Place "**Site**" in "**Rows**" and "**Date of Appointment**" in "**Values**"
- ✖ "**Insert Segment**" choose "**Specialty**".
- ✖ Choose: **Cardiology – Surgery – General – Obstetrics**.
- ✖ Expand the box if necessary to see all the specialties

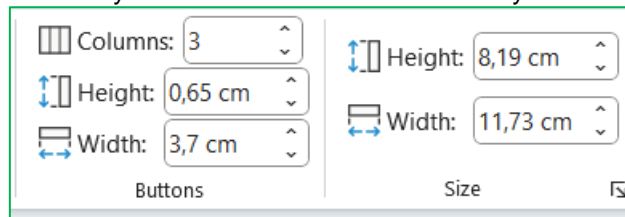


- ✖ Now you want to choose some doctors.
- ✖ Return to "**Insert Slicer**" choose "**Doctor's Name**"
- ✖ Observe that the doctors who are dark blue represent those who are selected in the specialty.

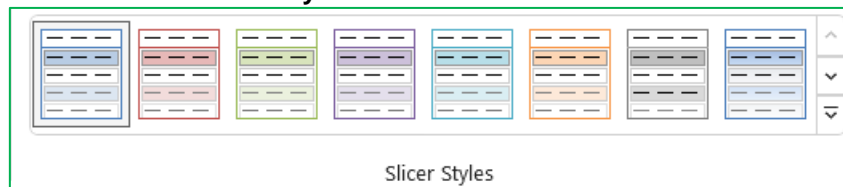
- ✖ Now choose a few doctors like this (Blue selection)



- ✖ Look again "**Specialty**"  
"Obstetrics" is grayed out, which means the doctor was not selected.
- ✖ Also note that we have "3 Columns" for doctors, it's up to you to decide the number of columns you want to see and the necessary width.



- ✖ You have also "**Slicer Styles**"



- ✖ To remove A filter of "**Doctor's name**" or from "**Specialty**" click on



## NOTE

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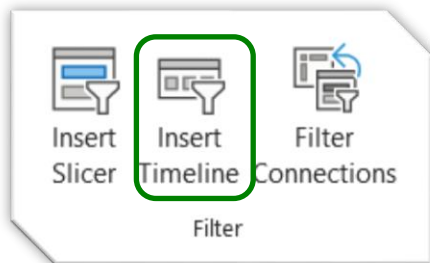
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## 22.14. Insert Timeline

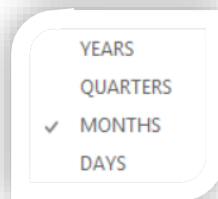
A "Timeline" is a "Slicer" with "date"



We will continue the previous exercise with "Timeline"

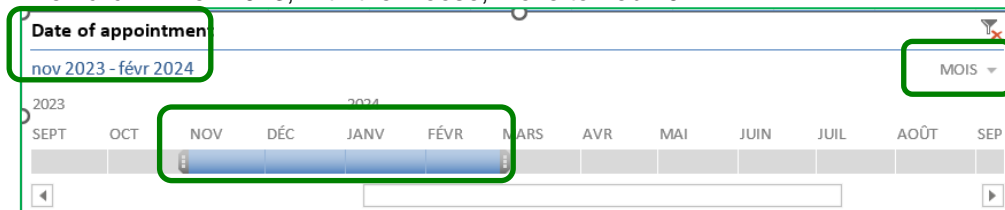
In "Timeline", we have 4 choices:

- ✖ YEARS
- ✖ QUARTERS
- ✖ MONTHS
- ✖ DAYS

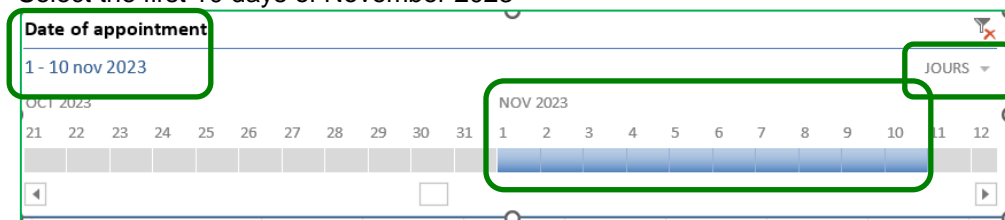


*Let's take again "Patient" sheet of the "Pivot Table" Workbook  
You would like to know the number of appointments per site,*

- ✖ Place "Site" in "Rows" and "Date of Appointment" in "Values"
- ✖ Choose the month of November 2023 and select date to the end of February 2024
- ✖ First, choose "MONTHS"
- ✖ Then click in Nov 2023, with the mouse, move to Feb 2024



- ✖ Modify "MONTHS" for "DAYS"
- ✖ Select the first 10 days of November 2023



## 23. Data validation

Data validation controls the type of data and values that users enter 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.

### 23.1. What is validation?

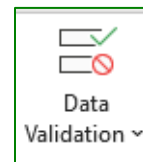
Data validation is an Excel feature that sets restrictions on the type and values of data allowed in a cell. You can set up data validation to prevent users from entering data that is not valid. If you prefer, you can allow users to enter invalid data but notify them when they type it into cells. You also can 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 must respect the case**



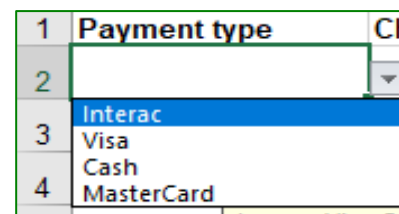
### 23.2. When to use data validation?

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:

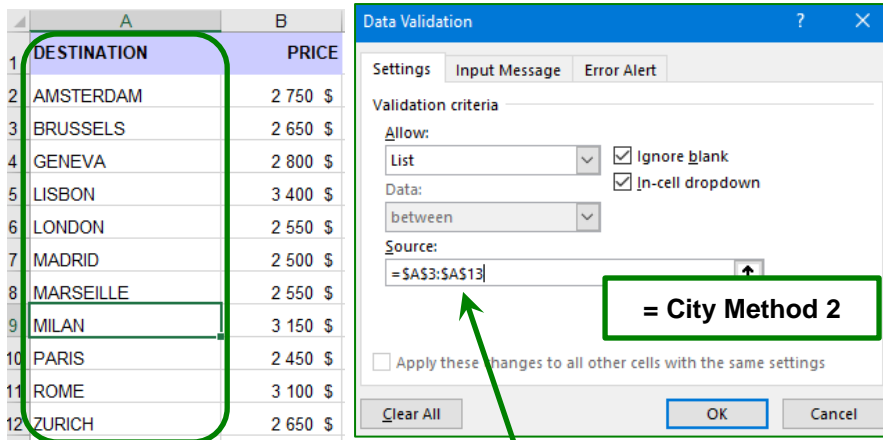
### 23.3. Limit data with a list

1. In a new sheet → in **Pivot Table** 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



### 23.4. Limit data with a list with a name

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

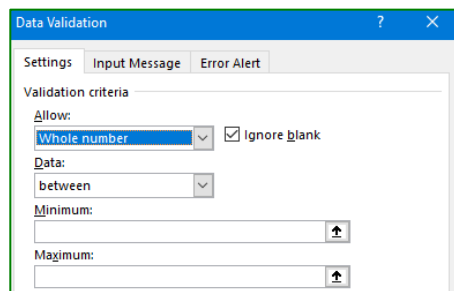


### 23.5. Limit data with a list by selection

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

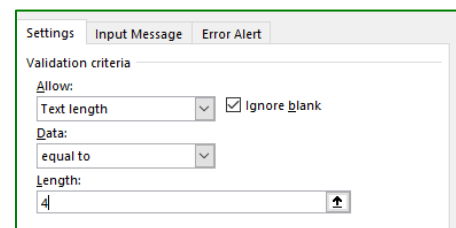
### 23.6. Limit numbers outside of a specified range

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



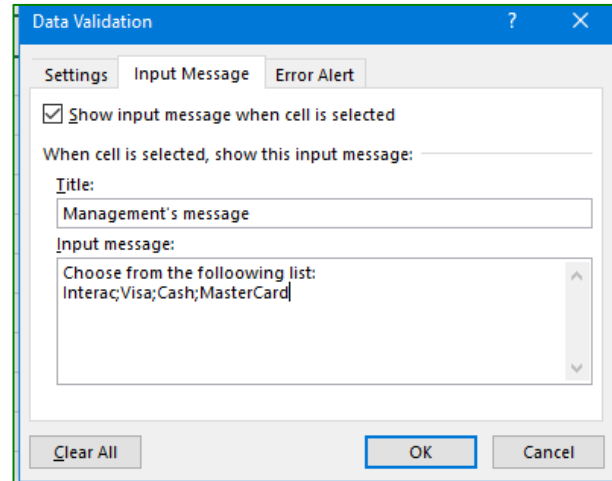
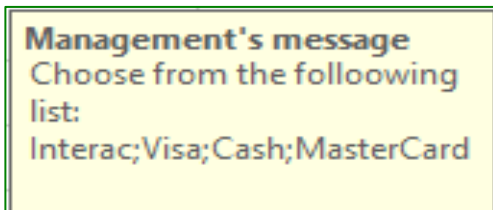
### 23.7. Limit the number of text characters

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.

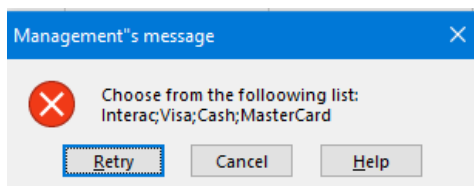


## 23.8. Data validation messages




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.



## 23.9. View an error message for invalid data.



## 23.10. There are 3 types of error message:

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

## 24. LIST OF SYMBOLS, CUSTOM FORMAT

### *Order Format / cell / numbers / custom category*

Symbol	Meaning
<b>0</b>	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.
<b>#</b>	Shows a number only if there is one. Doesn't show anything if there isn't one.
<b>?</b>	Like code 0 but displays a space instead of non-significant zeros.
<b>,</b>	The comma serves as a decimal separator. Can be defined as a point in the Windows configuration panel.
<b>%</b>	Converts the number into a percentage by multiplying by 100 and adding the sign.
<b>\$</b>	Shows the currency symbol.
<b>( )</b>	Shows parentheses.
<b>Space</b>	The space is used to separate the thousands. Can be modified for a comma in the Windows configuration panel.
<b>—</b>	The underscore leaves a space of 1 character. Can be used to align numbers both in the column and on the decimal symbol.
<b>d/m/yy</b>	Date format posted for January 5, 1985 - 5/1/85
<b>dd-mmm-yyyy</b>	Date format posted for January 5, 1985 - 05-Jan-1985
<b>dd/mm/yy</b>	Date format: posts 01/01/00 for January or 12/12/00 for December.
<b>mmm</b>	Shows the abbreviated names of the month (Jan to Dec).
<b>mmmm</b>	Shows the full name of the month (January to December).
<b>yy</b>	Shows the double-digit year
<b>yyyy</b>	Shows the four-digit year
<b>H</b>	Shows hours without zero (1 to 23).
<b>HH</b>	Shows hours with zero (01 to 23).
<b>hh:mm</b>	Shows hours and minutes
<b>[]</b>	Shows hours above 24 or minutes and seconds above 60. For example, [h]:mm gives 72:00 if the cell contains the value 3.
<b>[color]</b>	Shows according to the specified color. The available colors are black, blue, cyan, green, magenta, red, white, or yellow. Example: [red].

## 25. Error value

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

## 26. Exercise Pivot Table

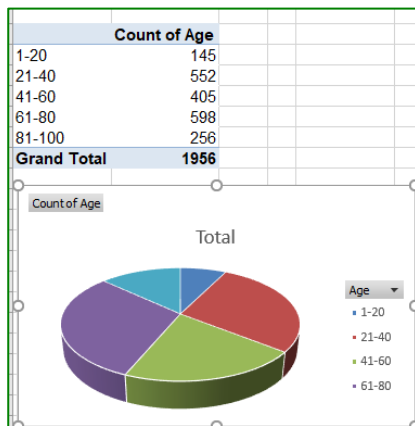
Open the workbook "**Pivot Table**"

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
<b>HD Total</b>			<b>664</b>
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
<b>ND Total</b>			<b>764</b>
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
<b>SL Total</b>			<b>528</b>
<b>Grand Total</b>			<b>1956</b>