Data Analysis Steps in Excel

1. Data Formatting (to make it readable)
2. Data Study (using filters)
3. Listing the Requirement (we will cover this shortly))
4. Analysis
    - i) Using Functions
    - ii) Using Pivots
5. Data Presentation

Excel Formulae

- Simple Mathematical operators
- Complex Formulas
- Performing calculations in Excel
- What is Range and how to fix it?

Formulas

- Simple Formulas – Mathematical Operators

=A1+A2	Adds cells A1 and A2
=C4-3	Subtracts 3 from cell C4
=E7/J4	Divides cell E7 by J4
=N10*1.05	Multiplies cell N10 by 1.05
=R5^2	Finds the square of cell R5

Formulas

- Complex Formulas – Mathematical Operators

Formulas (Order of Operations)

The Order of Operations tells Excel which **operation** to calculate first.

The order follows **BODMAS** rule.

1. Bracket
2. Operator (Exponents)
3. Division
4. Multiplication
5. Addition
6. Subtraction

$36 \div 6 \times 3 + 2^2 - (3 + 5)$

$= 36 \div 6 \times 3 + 2^2 - 8$ ⟷ Brackets: $(3 + 5)$

$= 36 \div 6 \times 3 + 4 - 8$ ⟷ Order of Powers: 2^2

$= 6 \times 3 + 4 - 8$ ⟷ Division: $36 \div 6$

$= 18 + 4 - 8$ ⟷ Multiplication: 6×3

$= 22 - 8$ ⟷ Addition: $18 + 4$

$= 14$ ⟷ Subtraction: $22 - 8$

Range

Range is a continuous collection/group of cells. Its address is given by providing the first and last cell.

In the below example, the range is C2:C8. It means the all the data from C2 to C8 is being selected.

	A	B	C	D
1	**Sr No**	**Sales Person**	**Jan-21**	**Feb-21**
2	1	Abhishek Y	242	247
3	2	Ajit Sharma	124	157
4	3	Amrendra Kumar	126	300
5	4	Arun Shetty	498	443
6	5	Birender Singh	214	201
7	6	Chandan R	420	482
8	7	Dharmendra Yadav	405	450
9	**Total Sales**		**=SUM(C2:C8)**	

Fixing of Range

- Absolute cell reference contains a **$** in a Row and/or Column
- Done by pressing F4 key
- Do not change when copied or filled.
- Use when you want to consistently refer to a certain cell, range, column or table array.

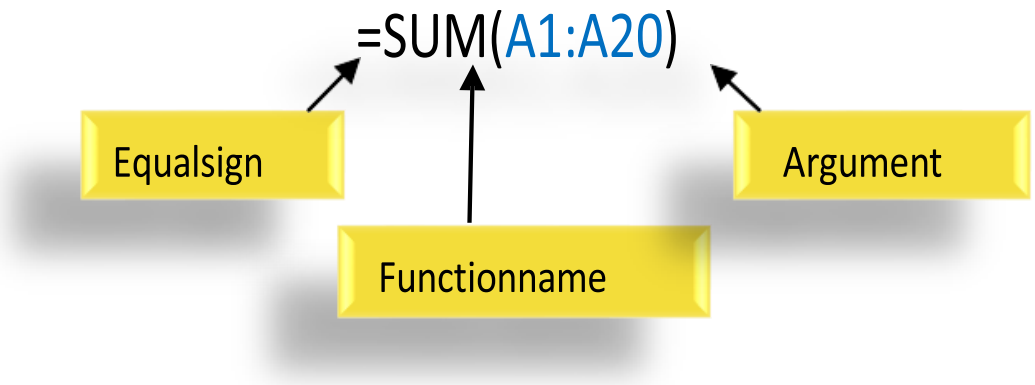
A1	**Relative (Both row and column are not fixed)**
A$1	**Column is relative; Row is fixed (constant)**
$A1	**Row is relative; Column is fixed**
A1	**BOTH are fixed**

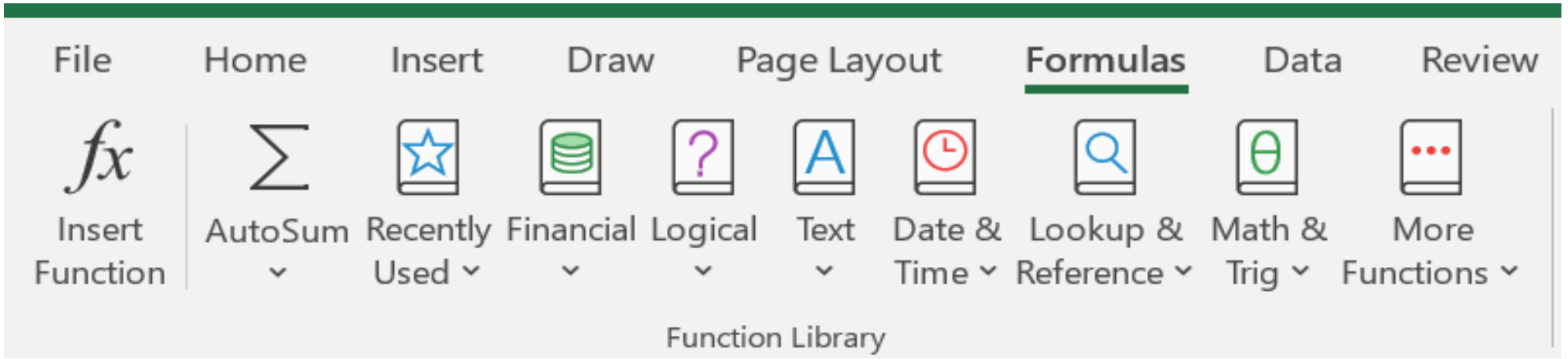
Excel Functions

- Introduction to Excel Functions
- Basic functions: SUM, AVERAGE, MAX, MIN COUNT etc
- List of commonly used functions
- Application of most important functions – IF, VLOOKUP, SUMIFS, COUNTIFS etc

Functions

A function is a predefined formula that performs calculations using specific values in a particular order





Basic Excel Functions

`=SUM(A2:A10)`	Adds its arguments. Here, the function will add the data present in cells from A2 to A10
`=AVERAGE(A2:A10)`	Returns the average of it's arguments. Here, the function will give the average of the data present in cells from A2 to A10
`=MAX(B2:B10)`	Returns the maximum value in a list of arguments
`=MIN(B2:B10)`	Returns the minimum value in a list of arguments
`=COUNT(A1:B10)`	Counts how many numbers are in the list of arguments

Commonly Used Functions

Below is the list of some of the most common and important Excel functions:

S/No	Function name	Category	Description
1	SUM	Math and trigonometry	Adds its arguments
2	AVERAGE	Statistical	Returns the average of its arguments
3	MAX	Statistical	Returns the maximum value in a list of arguments
4	MIN	Statistical	Returns the minimum value in a list of arguments
5	SUBTOTAL	Math and trigonometry	Returns a subtotal in a list or database
6	SUMIF	Math and trigonometry	Adds the cells specified by a given criteria
7	SUMIFS	Math and trigonometry	Adds the cells in a range that meet multiple criteria

Commonly Used Functions

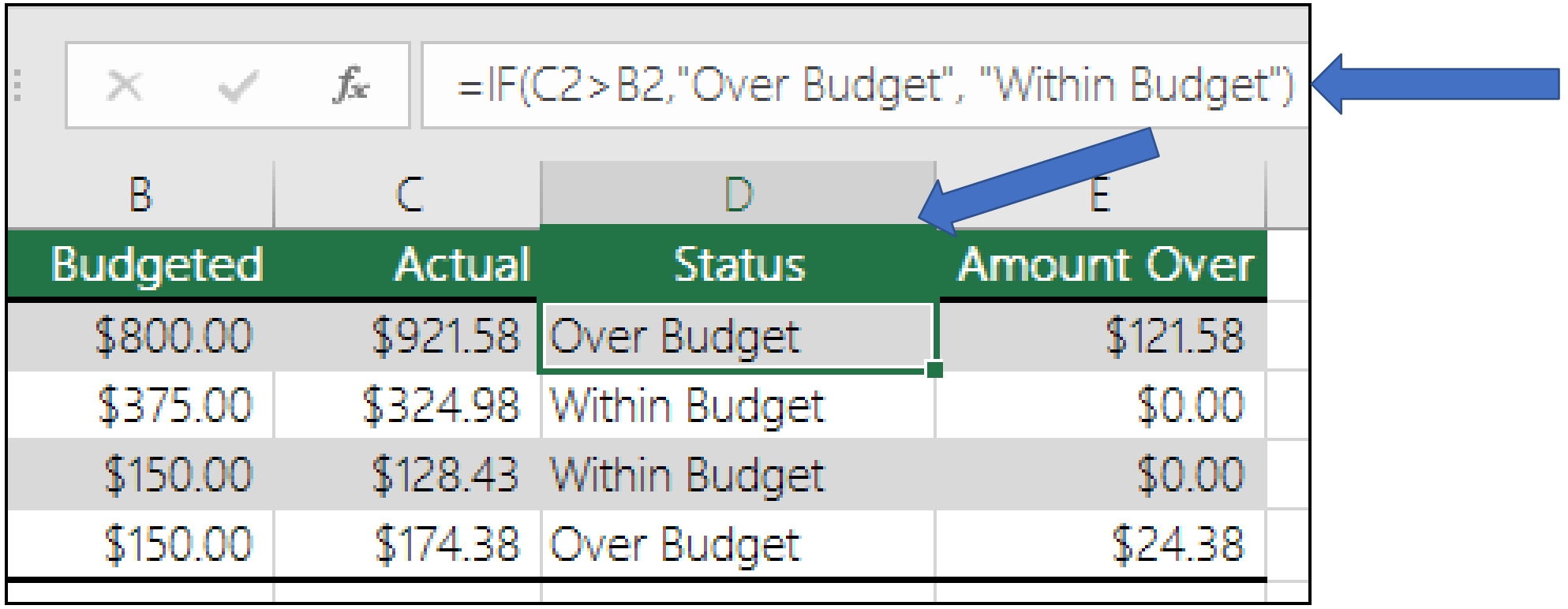
S/No	Function name	Category	Description
8	COUNT	Statistical	Counts how many numbers are in the list of arguments
9	COUNTA	Statistical	Counts how many values are in the list of arguments
10	COUNTIF	Statistical	Counts the number of cells within a range that meet the given criteria
11	COUNTIFS	Statistical	Counts the number of cells within a range that meet multiple criteria
12	ABS	Math and trigonometry	Returns the absolute value of a number
13	VLOOKUP	Lookup and reference	Looks in the first column of an array and moves across the row to return the value of a cell
14	HLOOKUP	Lookup and reference	Looks in the top row of an array and returns the value of the indicated cell
15	MATCH	Lookup and reference	Looks up values in a reference or array
16	INDEX	Lookup and reference	Uses an index to choose a value from a reference or array
17	COLUMN	Lookup and reference	Returns the column number of a reference
18	ROW	Lookup and reference	Returns the row number of a reference
19	IF	Logical	Specifies a logical test to perform
20	IFERROR	Logical	Returns a value you specify if a formula evaluates to an error; otherwise, returns the result of the formula
21	IFNA	Logical	Returns the value you specify if the expression resolves to #N/A, otherwise returns the result of the expression
22	IFS	Logical	Checks whether one or more conditions are met and returns a value that corresponds to the first TRUE condition.
23	AND	Logical	Returns TRUE if all of its arguments are TRUE
24	OR	Logical	Returns TRUE if any argument is TRUE

Commonly Used Functions

S/No	Function name	Category	Description
25	ROUND	Math and trigonometry	Rounds a number to a specified number of digits
26	ROUNDDOWN	Math and trigonometry	Rounds a number down, toward zero
27	ROUNDUP	Math and trigonometry	Rounds a number up, away from zero
28	TODAY	Date and time	Returns the serial number of today's date
29	DATE	Date and time	Returns the serial number of a particular date
30	DAY	Date and time	Converts a serial number to a day of the month
31	DAYS	Date and time	Returns the number of days between two dates
32	DAYS360	Date and time	Calculates the number of days between two dates based on a 360-day year
33	EDATE	Date and time	Returns the serial number of the date that is the indicated number of months before or after the start date
34	EOMONTH	Date and time	Returns the serial number of the last day of the month before or after a specified number of months
35	TEXT	Text	Formats a number and converts it to text
36	CONCATENATE	Text	Joins several text items into one text item
37	LEN,	Text	Returns the number of characters in a text string
38	LEFT,	Text	Returns the leftmost characters from a text value
39	RIGHT,	Text	Returns the rightmost characters from a text value
40	PROPER	Text	Capitalizes the first letter in each word of a text value
41	LOWER	Text	Converts text to lowercase
42	UPPER	Text	Converts text to uppercase
43	ISBLANK	Information	Returns TRUE if the value is blank
44	ISERROR	Information	

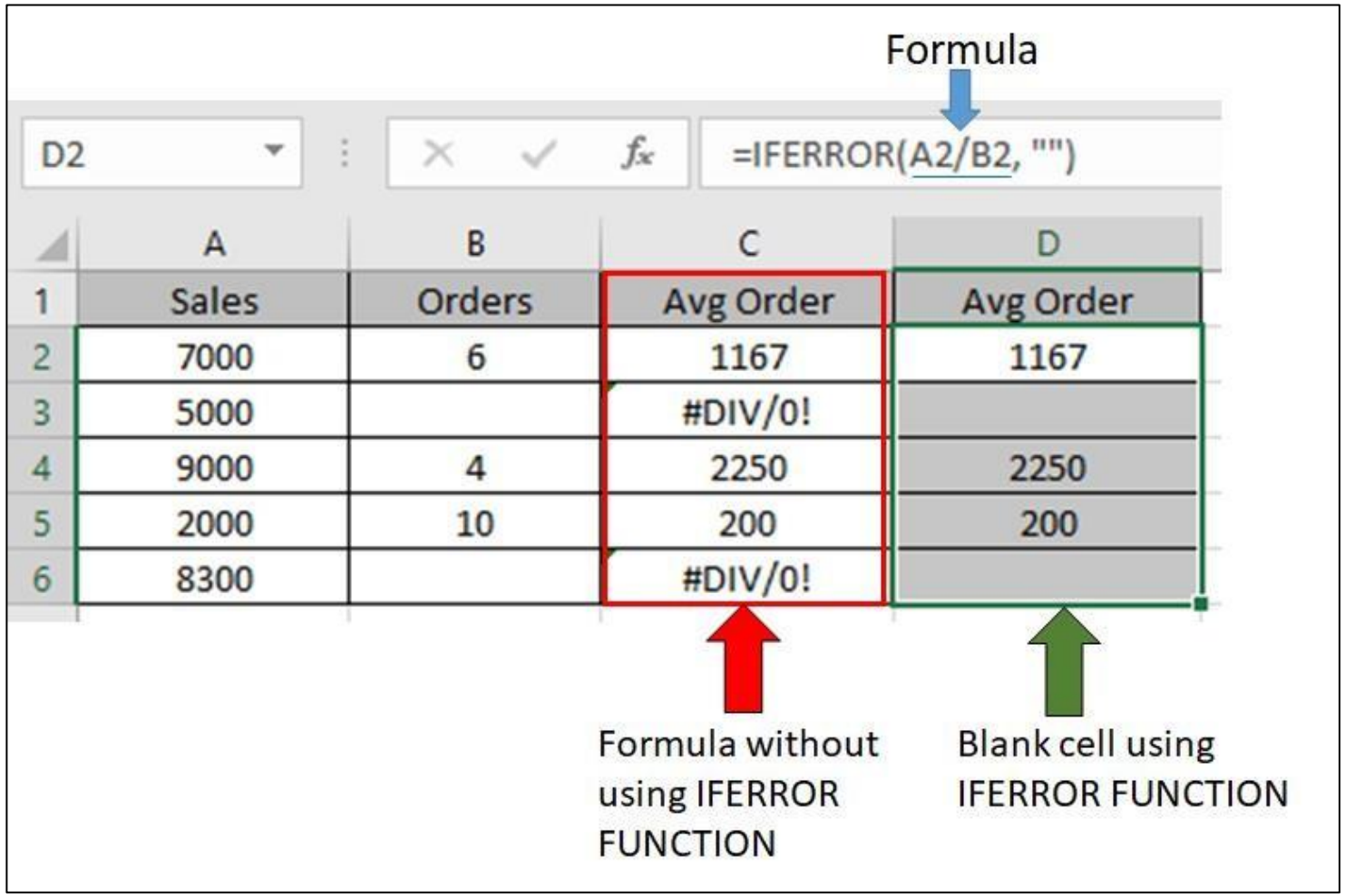
Important Functions: IF

The **IF** function runs a logical test and returns one value for a TRUE result, and another for a FALSE result.



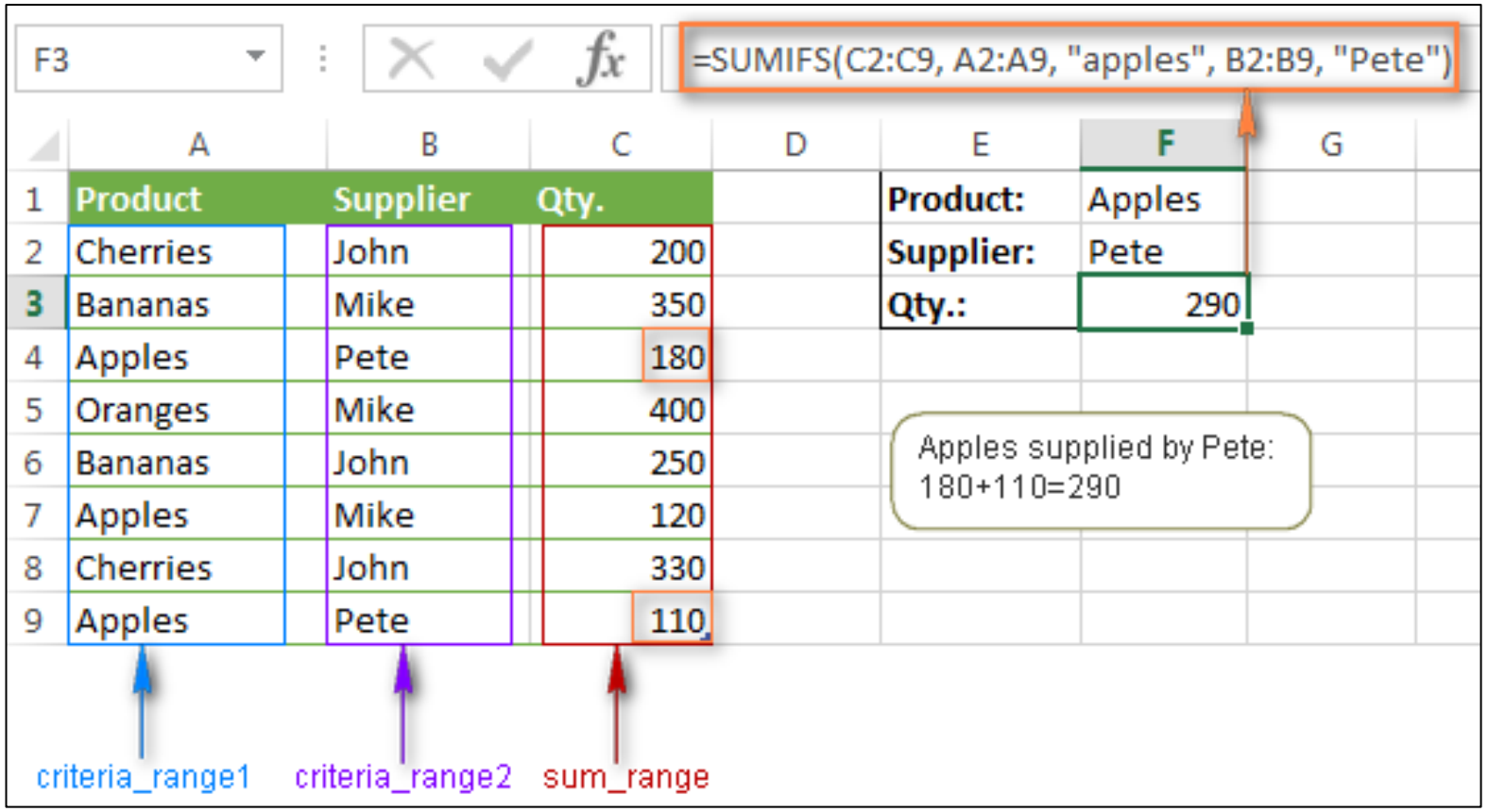
Important Functions: IFERROR

You can use the **IFERROR** function to trap and handle errors in a formula. IFERROR returns a value you specify if a formula evaluates to an error; otherwise, it returns the result of the formula.



Important Functions: SUMIFS

SUMIFS is **a function to sum cells that meet multiple criteria**. SUMIFS can be used to sum values when corresponding cells meet criteria based on dates, numbers, and text. SUMIFS also supports logical operators (>,<,<>,=)



Important Functions: SUMIFS

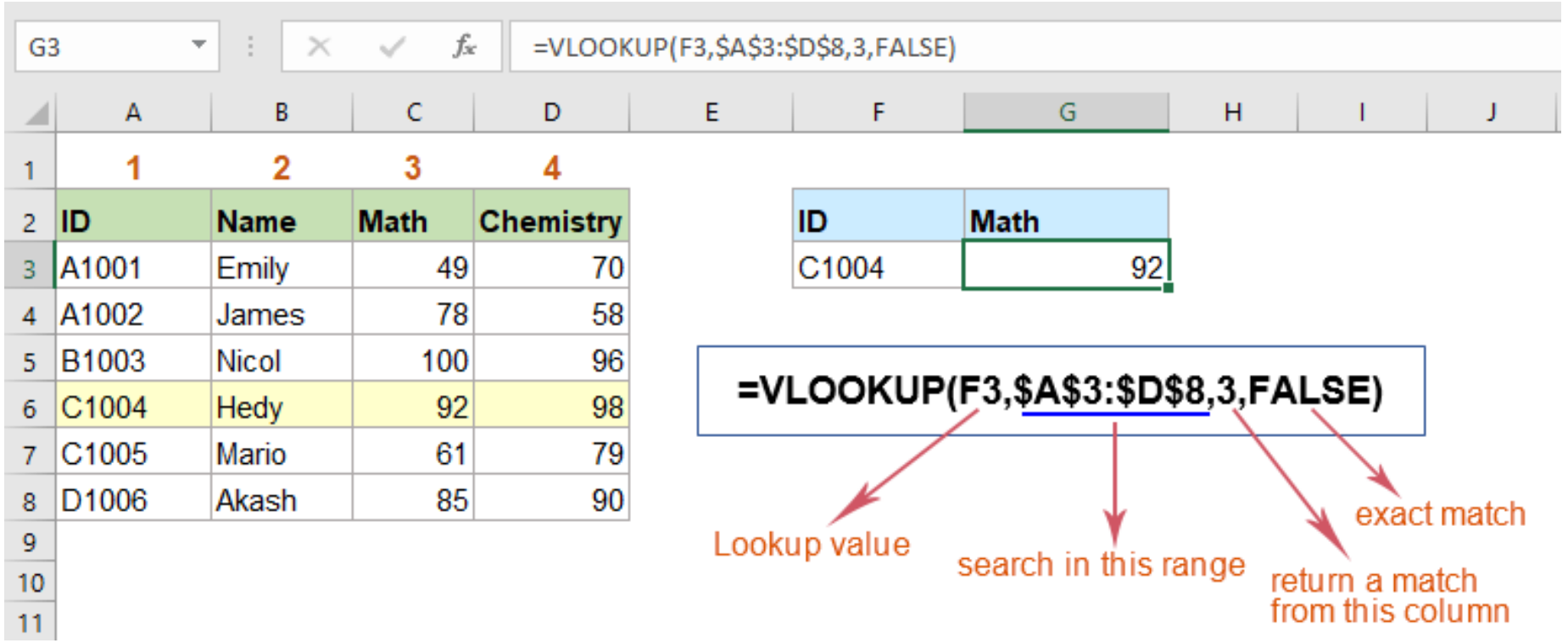
- We want to know how many HP Laser Jet Printers we have.
- =sumif(a2:a14,”HP Laser Jet”,c2:c14)
- Which equals 11
- We want to know how many HP Laser Jet Printers the POLICE have.
- =sumifs(c2:c14,a2:14,”HP Laser Jet”,b2:b14,”Police”)
- Which equals 3

= sums the cells with the value of "10"

Color Printers	Dept	Quanity
HP Laser Jet	Admin	4
HP M553	Construction	5
HP Laser Jet	Construction	1
Epson WF2750	Police	4
HP Laser Jet Pro	Fire Prevention	1
Canon MF634	Human Svcs	2
HP Laser Jet	Police	3
Canon MF634	Recreation	3
HP Laser Jet	Parks	1
HP M553	Clerk	1

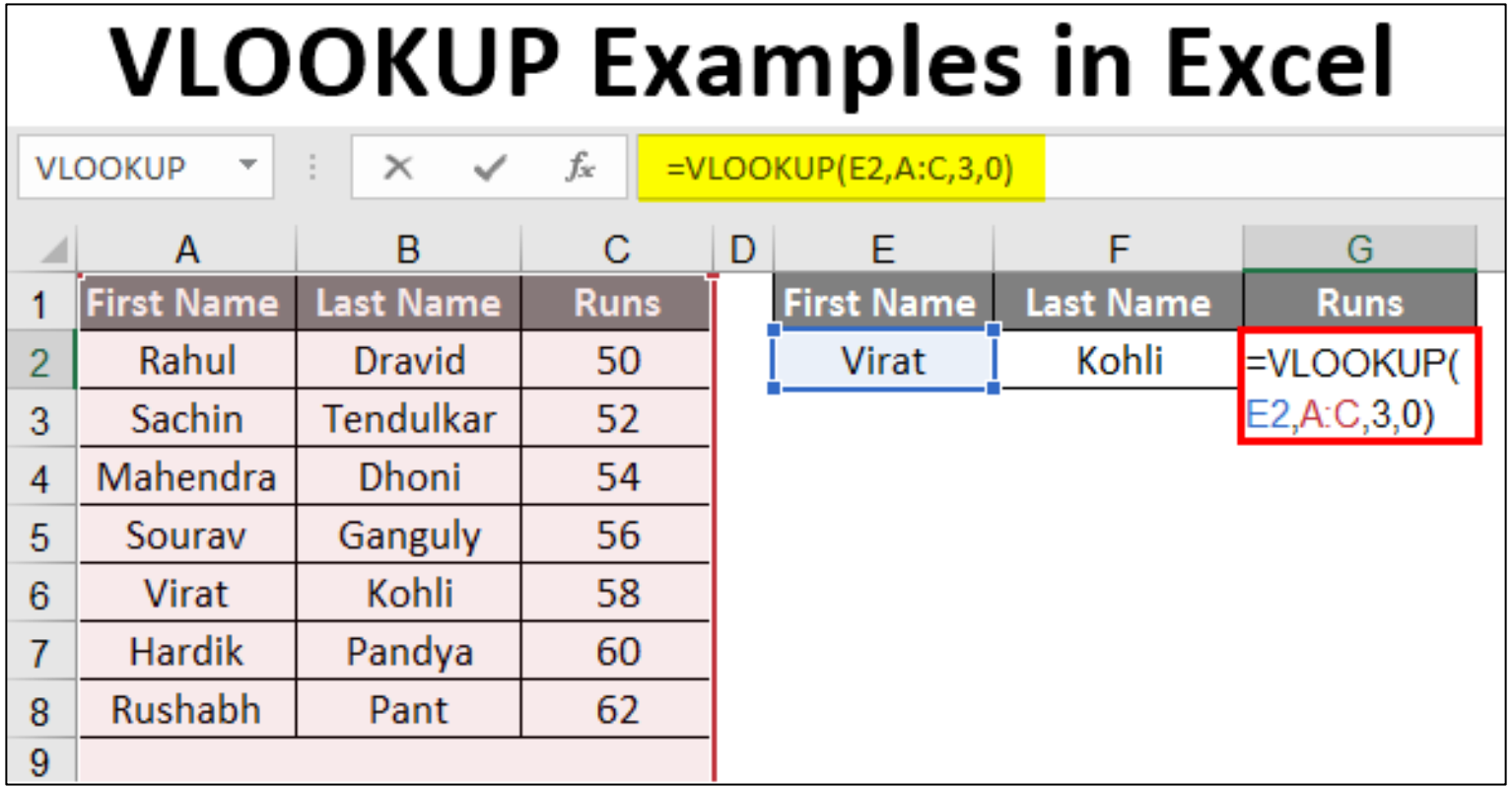
Important Functions: VLOOKUP

VLOOKUP is an **Excel function** to get data from a table organized vertically. Lookup values must appear in the first column of the table passed into **VLOOKUP**.



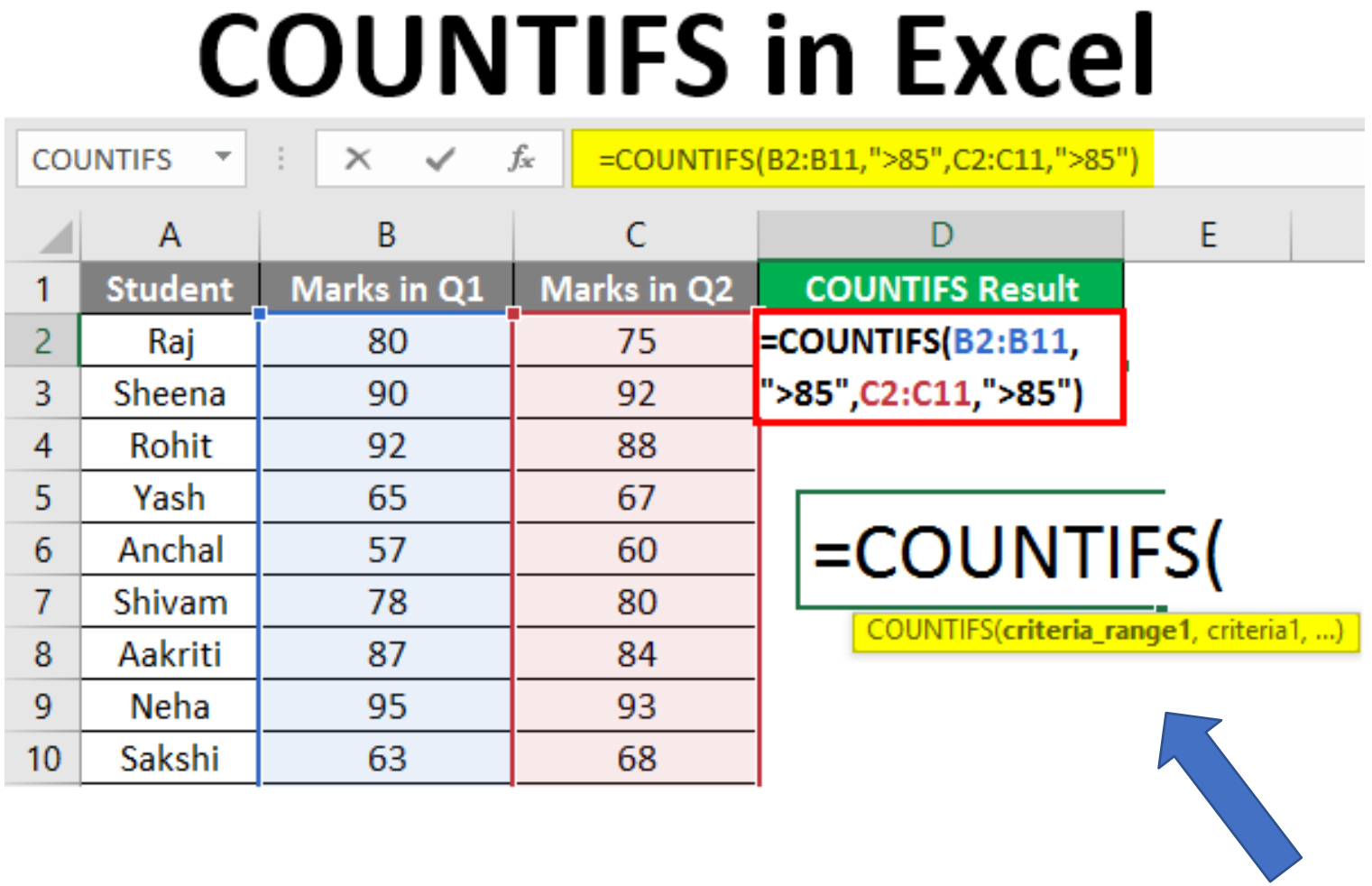
Important Functions: VLOOKUP

- In the Formula Bar, type =VLOOKUP().
- In the parentheses, enter your lookup value, followed by a comma.
- Enter your table array or lookup table, the range of data you want to search, and a comma.
- Enter column index number.
- Enter the range lookup value, either TRUE or FALSE.



Important Functions: COUNTIFS

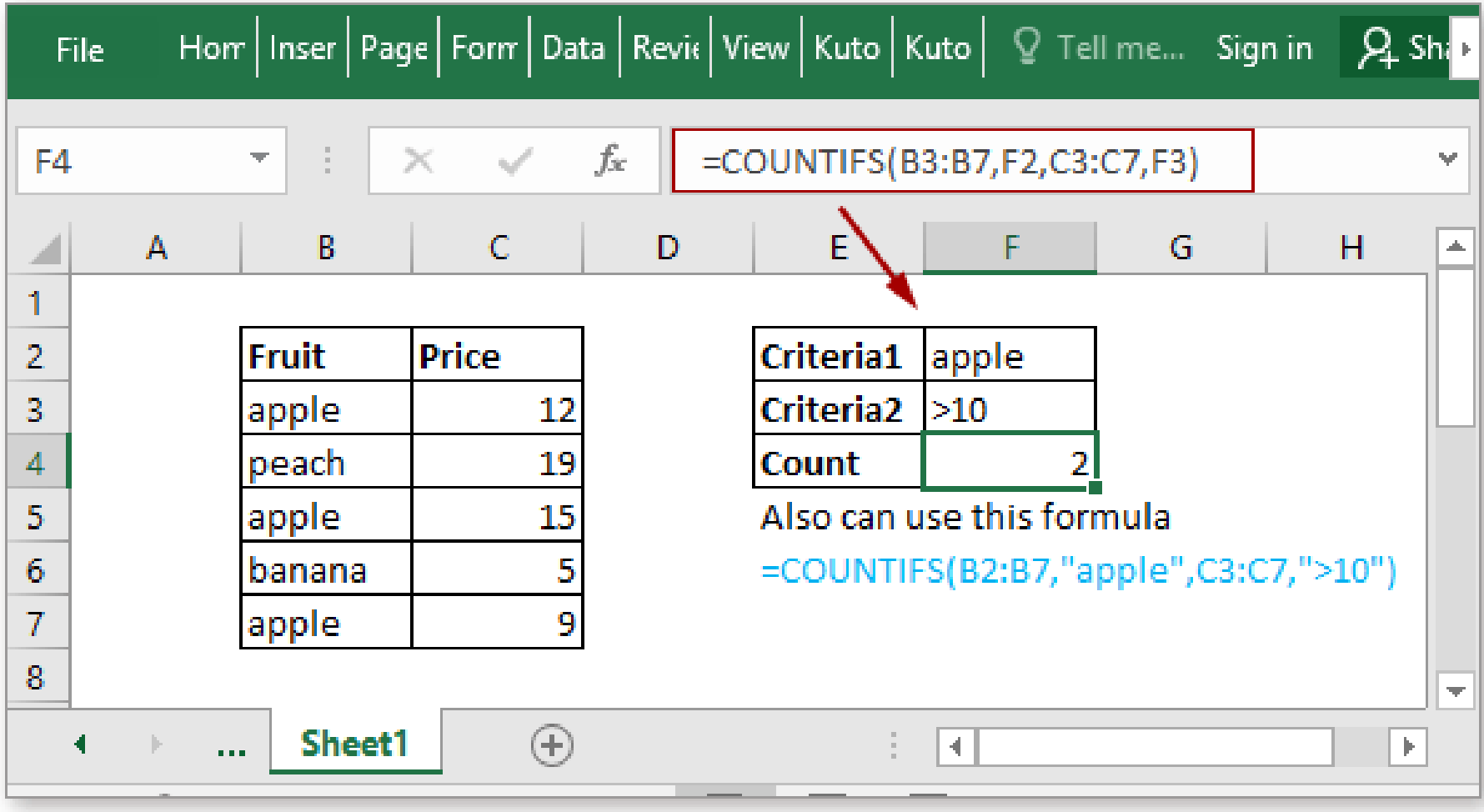
The **Excel COUNTIFS function** returns the count of cells that meet one or more criteria. COUNTIFS can be used with criteria based on dates, numbers, text, etc.



Important Functions: COUNTIFS

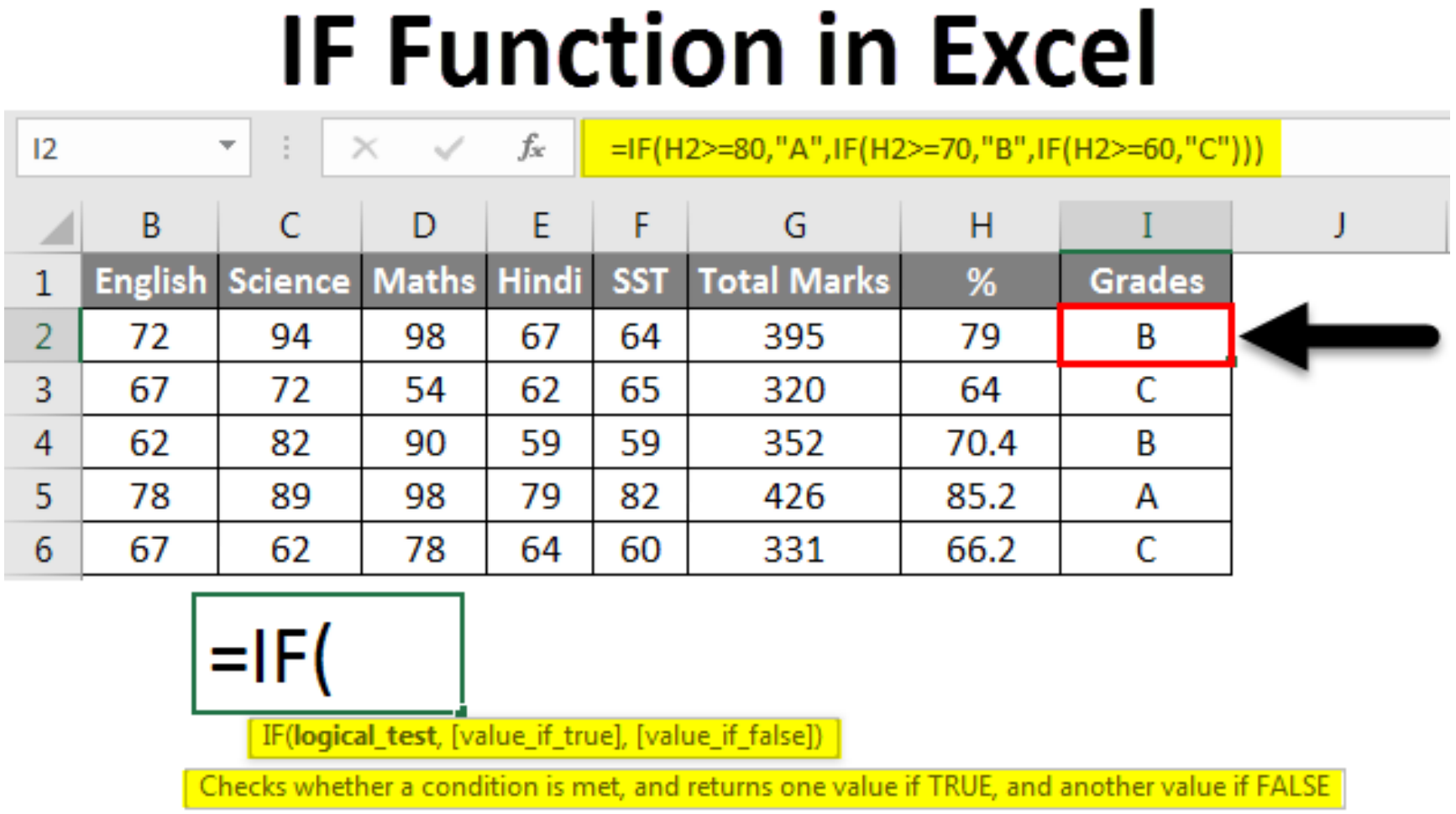
- The COUNTIFS function is a premade function in Excel, which counts cells in a range based on one or more true or false condition.

- It is typed =COUNTIFS : **=COUNTIFS(criteria_range1, criteria1, [criteria_range2, criteria2], ...)**



IF (Nested)

You can use multiple **Ifs** inside **IF** function.



	B	C	D	E	F	G	H	I	J
1	English	Science	Maths	Hindi	SST	Total Marks	%	Grades	
2	72	94	98	67	64	395	79	B	
3	67	72	54	62	65	320	64	C	
4	62	82	90	59	59	352	70.4	B	
5	78	89	98	79	82	426	85.2	A	
6	67	62	78	64	60	331	66.2	C	

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    - i) Using Functions
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5. Data Presentation

Pivot Tables

- What is a pivot table and why we need it?
- How to create Pivot Table

Excel Pivot Tables (Why We Need Pivot Tables?**)**

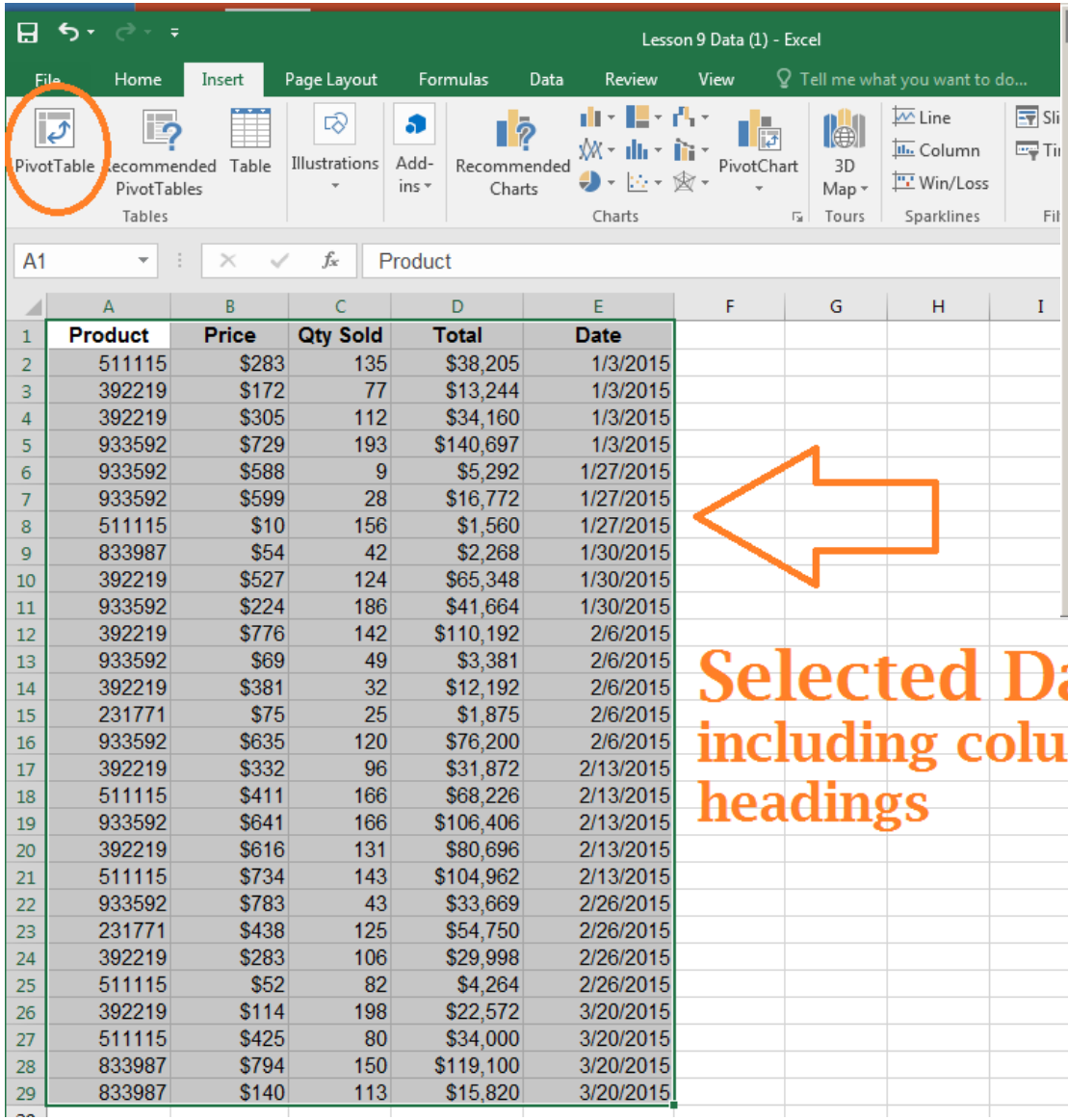
- As per the business requirement, PivotTables summarize and analyze large amounts of data into useful business insights and summary reports.
- A pivot table is an incredibly powerful tool in Excel that can be used to analyze, explore and summarize your data.

	A	B	C	D	E
1	**Product**	**Price**	**Qty Sold**	**Total**	**Date**
2	511115	$283	135	$38,205	1/3/2015
3	392219	$172	77	$13,244	1/3/2015
4	392219	$305	112	$34,160	1/3/2015
5	933592	$729	193	$140,697	1/3/2015
6	933592	$588	9	$5,292	1/27/2015
7	933592	$599	28	$16,772	1/27/2015
8	511115	$10	156	$1,560	1/27/2015
9	833987	$54	42	$2,268	1/30/2015
10	392219	$527	124	$65,348	1/30/2015
11	933592	$224	186	$41,664	1/30/2015
12	392219	$776	142	$110,192	2/6/2015
13	933592	$69	49	$3,381	2/6/2015
14	392219	$381	32	$12,192	2/6/2015
15	231771	$75	25	$1,875	2/6/2015
16	933592	$635	120	$76,200	2/6/2015
17	392219	$332	96	$31,872	2/13/2015
18	511115	$411	166	$68,226	2/13/2015
19	933592	$641	166	$106,406	2/13/2015
20	392219	$616	131	$80,696	2/13/2015
21	511115	$734	143	$104,962	2/13/2015
22	933592	$783	43	$33,669	2/26/2015
23	231771	$438	125	$54,750	2/26/2015
24	392219	$283	106	$29,998	2/26/2015
25	511115	$52	82	$4,264	2/26/2015
26	392219	$114	198	$22,572	3/20/2015

Sum of Qty Sold	**Jan**	**Feb**	**Mar**	**Grand Total**
231771		150		150
392219	313	507	198	1018
511115	291	391	80	762
833987	42		263	305
933592	416	378		794
Grand Total	**1062**	**1426**	**541**	**3029**

Excel Pivot Tables (Let's create our first Pivot table.**)**

1. Select all cells, including header row.
2. Insert tab > PivotTable (most left side)
3. Click "OK" on pop-up window
4. Automatically directed to new sheet, with PivotTable controls.



Excel Pivot Tables (Parts of Pivot table.)