

## Unit : 2 – Formulas, Charts and Data

### Charts in Worksheet :

A chart is a visual representation of numeric values. Charts (also known as graphs) have been an integral part of spreadsheets. Charts generated by early spreadsheet products were quite crude, but they have improved significantly over the years. Excel provides you with the tools to create a wide variety of highly customizable charts. Displaying data in a well-conceived chart can make your numbers more understandable. Because a chart presents a picture, charts are particularly useful for summarizing a series of numbers and their interrelationships.

#### ❖ Importance of Chart :

- Allows you to visualize data graphically.
- It's easier to analyse trends and patterns in the charts
- Easy to interpret compared to data in cell

#### ❖ Types Of Charts or Graphs:

1. **Column** – Column chart shows data changes over a period of time or illustrates comparisons among items.
2. **Bar** – A bar chart illustrates comparisons among individual items.
3. **Pie** – A pie chart shows the size of items that make up a data series, proportional to the sum of the items. It always shows only one data series and is useful when you want to emphasize a significant element in the data.
4. **Line** – A line chart shows trends in data at equal intervals.
5. **Area** – An area chart emphasizes the magnitude of change over time.
6. **X Y Scatter** – An xy (scatter) chart shows the relationships among the numeric values in several data series, or plots two groups of numbers as one series of xy coordinates.
7. **Stock** – This chart type is most often used for stock price data, but can also be used for scientific data (for example, to indicate temperature changes).
8. **Bubble** – Data that is arranged in columns on a worksheet, so that x values are listed in the first column and corresponding y values and bubble size values are listed in adjacent columns, can be plotted in a bubble chart.
9. **Radar** – A radar chart compares the aggregate values of a number of data series.


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### ❖ 2D & 3D Charts:

➤ **2D Charts:** A 2D, or two-dimensional, shape has length and height as its dimensions. Also known as plane shapes, they can be plotted in a graph on the x- and y-axes. Circle, triangle, and square are some of the most common examples of 2D figures.

➤ **3D Charts:** A 3D, or three-dimensional, shape has length, height, and width (depth) as its dimensions. Mathematically, 2D figures are plotted on the x-, y-, and z-axes of a graph. Cylinders, pyramids, and cubes are some of the most common examples of 3D shapes.

	2D	3D
	2D	3D
Definition	Two-dimensional	Three-dimensional
Dimensions	Length and height	Length, height, and width
Mathematical Definition	x- and y-axes	x-, y-, and z-axes
Examples	Circle, triangle, square, rectangle, and pentagon	Cylinder, pyramid, cube, and prism



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### ❖ Steps to Create Charts:

- Open Excel
- Enter the data from the sample data table above
- Your workbook should now look as follows

	2012	2013	2014	2015
Desktop Computers	20	12	13	12
Laptops	34	45	40	39
Monitors	12	10	17	15
Printers	78	13	90	14

To get the desired chart you have to follow the following steps

1. Select the data you want to represent in graph

1. Highlight the data

2. Click on INSERT tab

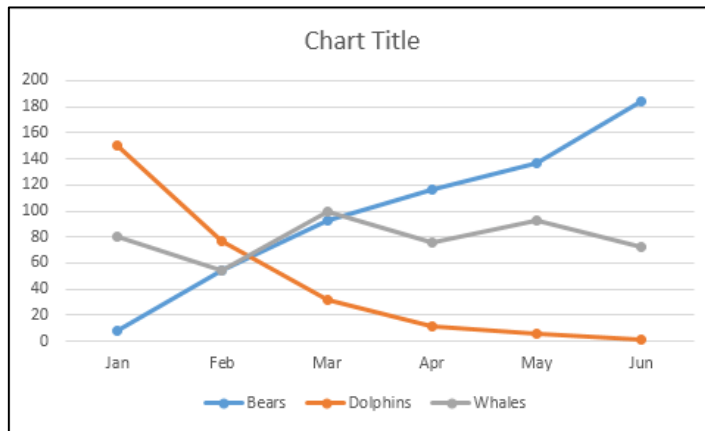
3. Click on Column chart drop down button

4. Select chart type

2. Click on INSERT tab from the ribbon
3. Click on the Column chart drop down button
4. Select the chart type you want

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Result:



### ➤ **Change Chart Type:**

You can easily change to a different type of chart at any time.

1. Select the chart.
2. On the Design tab, in the Type group, click Change Chart Type.
3. On the left side, click Column.
4. Click OK.

### ➤ **Switch Row/ Column:**

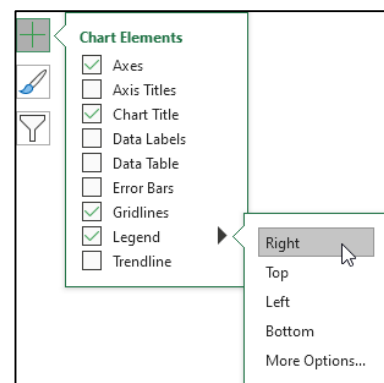
If you want to display the animals (instead of the months) on the horizontal axis, execute the following steps.

1. Select the chart.
2. On the Design tab, in the Data group, click Switch Row/Column.

### ➤ **Legend Position:**

To move the legend to the right side of the chart, execute the following steps.

1. Select the chart.
2. Click the + button on the right side of the chart, click the arrow next to Legend and click Right.

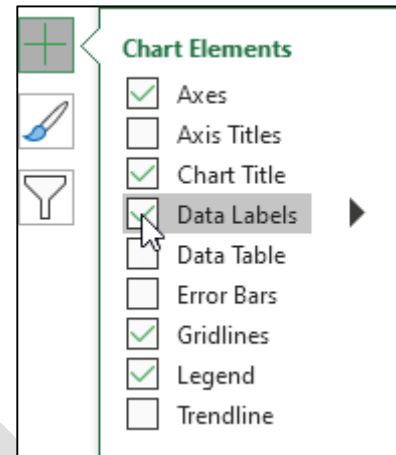


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### ➤ **Data Label:**

You can use data labels to focus your readers' attention on a single data series or data point.

1. Select the chart.
2. Click a green bar to select the Jun data series.
3. Hold down CTRL and use your arrow keys to select the population of Dolphins in June (tiny green bar).
4. Click the + button on the right side of the chart and click the check box next to Data Labels.



### ❖ **Difference Between Column, Line and Bar Chart:**

➤ **A Column Chart** typically displays the categories along the horizontal (category) axis and values along the vertical (value) axis. To create a column chart, arrange the data in columns or rows on the worksheet.

➤ A column chart has the following sub-types –

- Clustered Column.
- Stacked Column.
- 100% Stacked Column.
- 3-D Clustered Column.
- 3-D Stacked Column.
- 3-D 100% Stacked Column.
- 3-D Column.

➤ Line charts can show continuous data over time on an evenly scaled Axis. Therefore, they are ideal for showing trends in data at equal intervals, such as months, quarters or years.

➤ In a Line chart –

- Category data is distributed evenly along the horizontal axis.
- Value data is distributed evenly along the vertical axis.

➤ To create a Line chart, arrange the data in columns or rows on the worksheet.

➤ A Line chart has the following sub-types –

- Line
- Stacked Line

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- 100% Stacked Line
  - Line with Markers
  - Stacked Line with Markers
  - 100% Stacked Line with Markers
  - 3-D Line
- Bar Charts illustrate comparisons among individual items. In a Bar Chart, the categories are organized along the vertical axis and the values are organized along the horizontal axis. To create a Bar Chart, arrange the data in columns or rows on the Worksheet.
- A Bar Chart has the following sub-types –
- Clustered Bar
  - Stacked Bar
  - 100% Stacked Bar
  - 3-D Clustered Bar
  - 3-D Stacked Bar
  - 3-D 100% Stacked Bar

### **Formulas:**

- ❖ **Sum():**
- Finds the sum of the numbers in the specified cells.
  - The syntax of the function is:  
**=SUM( number1, [number2], ... )**
  - where the number arguments are a set of numbers (or arrays of numbers) that you want to find the sum of.
  - For Example: =SUM(10,20,30)
  - Then answer is :60
- ❖ **Average():** Returns the average (arithmetic mean) of the argument
- Syntax:  
**=AVERAGE (number1, [number2],...)**
  - The AVERAGE function syntax has the following arguments:

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Number1: Required. The first number, cell reference, or range for which you want the average.

Number2: Optional. Additional numbers, cell references or ranges for which you want the average, up to a maximum of 255.

B9		X ✓ fx		=AVERAGE(B2:B7)		
	A	B	C	D	E	F
1	Mark1	Mark2				
2		10	10			
3		15	20			
4		45	30			
5		5	40			
6		56	50			
7		20	60			
8						
9		35				

### ❖ Count():

#### ➤ **COUNT():**

- Counts the number of cells in a specified range that contain a numeric value.

- Syntax:

**=COUNT(value1, [value2], ...)**

- The COUNT function syntax has the following arguments:

**value1** Required. The first item, cell reference, or range within which you want to count numbers.

**value2, ...** Optional. Up to 255 additional items, cell references, or ranges within which you want to count numbers.

- NOTE:** The arguments can contain or refer to a variety of different types of data, but only numbers are counted.

- Example:

	A	B	C
1	Sr No	Name	Computer Application
2	1	Krishna	42
3	2	Nikita	43
4	3	Manuni	25
5	4	Tanvi	20
6	5	Ishita	35
7	6	Vibhuti	46
8	7	Trupti	38
9	8	Vishva	32
10	9	Roshni	12
11	10	Drashti	5
12			=Count(C2:C11)

- It gives ans:10

#### ➤ **COUNTA():**

- Count the number of cells in a range that are not empty.

- Syntax

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### =COUNTA(value1, [value2], ...)

- The COUNTA function syntax has the following arguments:  
**value1** Required. The first argument representing the values that you want to count.  
**value2, ...** Optional. Additional arguments representing the values that you want to count, up to a maximum of 255 arguments.
- The COUNTA function counts cells containing any type of information, including error values and empty text (""). For example, if the range contains a formula that returns an empty string, the COUNTA function counts that value. The COUNTA function does not count empty cells.
- If you do not need to count logical values, text, or error values (in other words, if you want to count only cells that contain numbers), use the COUNT function.

### ➤ COUNTBLANK():

- Counts the number of cells in a range that are empty.

### ➤ COUNTIF():

- Count the number of cells in a range that meet a given criterion.
- Syntax

### =COUNTIF(range, criteria)

- Arguments:

**Range:** The group of cells you want to count. *Range* can contain numbers, arrays, a named range, or references that contain numbers. Blank and text values are ignored.

**Criteria:** A number, expression, cell reference, or text string that determines which cells will be counted.

C12		fx		=COUNTIF(C2:C11,"<10")
	A	B	C	D
1	Sr No	Name	Computer Application	
2	1	Krishna	42	
3	2	Nikita	43	
4	3	Manuni	25	
5	4	Tanvi	20	
6	5	Ishita	35	
7	6	Vibhuti	46	
8	7	Trupti	38	
9	8	Vishva	32	
10	9	Roshni	12	
11	10	Drashti	5	
12				1



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### ➤ COUNTIFS():

- Counts the number of cells in a range that meet multiple criteria.

- Syntax:

**=COUNTIFS (range1, criteria1, [range2], [criteria2], ...)**

- Arguments

**range1** - The first range to evaluate.

**criteria1** - The criteria to use on range1.

**range2** - [optional] The second range to evaluate.

**criteria2** - [optional] The criteria to use on range2.

	A	B	C	D	E	F	G
1	Name	Designation	Salary				
2	krishna	Manager	50000				
3	nikita	Manager	60000				
4	pooja	Peon	10000				
5	abc	clerk	20000				
6	xyz	HR	3000				
7							
8		=COUNTIFS(B2:B6,\"Manager\",C2:C6,\">=50000\")					
9							
10							

- Output: 2

❖ **Max():** The Excel MAX function returns the largest numeric value in a range of values. The MAX function ignores empty cells, the logical values TRUE and FALSE, and text values.

- Syntax

**=MAX (number1, [number2], ...)**

- Arguments

**number1:** Number, reference to numeric value, or range that contains numeric values.

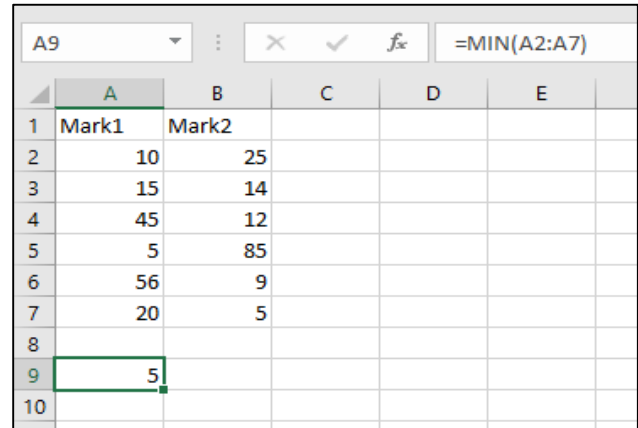
**number2 :** [optional] Number, reference to numeric value, or range that contain numeric values.

	A	B	C	D	E	F
1	Mark1	Mark2				
2	10	25				
3	15	14				
4	45	12				
5	5	85				
6	56	9				
7	20	5				
8						
9		=MAX(B2:B7)				
10						

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❖ **Min():** The Excel MIN function returns the smallest numeric value in a range of values. The MIN function ignores empty cells, the logical values TRUE and FALSE, and text values.

- Syntax :  
**=MIN (number1, [number2], ...)**
- Arguments :  
number1 - Number, reference to numeric value, or range that contains numeric values.  
number2 - [optional] Number, reference to numeric value, or range that contains numeric values.



	A	B	C	D	E
1	Mark1	Mark2			
2	10	25			
3	15	14			
4	45	12			
5	5	85			
6	56	9			
7	20	5			
8					
9	5				
10					

❖ **Sumif():**

- The SUMIF function is a worksheet function that adds all numbers in a range of cells based on one criteria (for example, is equal to 2000).
- Syntax:  
**=SUMIF(range,criteria,[sum\_range])**
- Arguments:  
**range:**The range of cells that you want to apply the *criteria* against.  
**criteria:**The criteria used to determine which cells to add.  
**sum\_range:** Optional. It is the range of cells to sum together. If this parameter is omitted, it uses *range* as the *sum\_range*

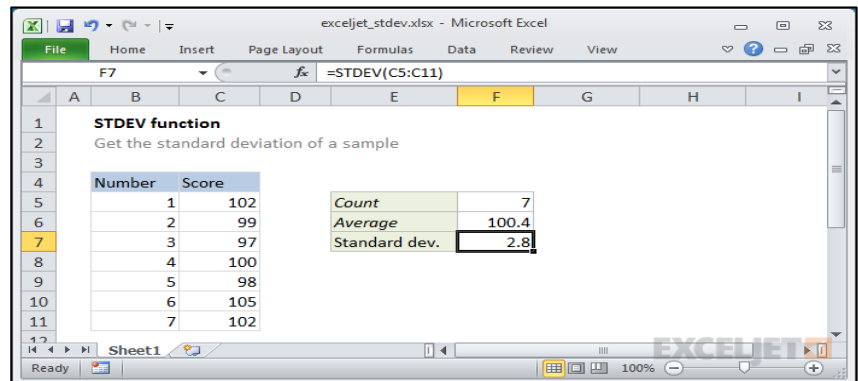
❖ **Pmt():**

- PMT function returns the payment amount for a loan based on an interest rate and a constant payment schedule.
- Syntax:  
**=PMT(rate,nper,pv,[fv],[type])**
- Arguments:  
**Rate:** the rate of interest loans.  
**Nper:** is the total number of installments  
**PV :** current value (for example the amount of credit)  
**FV :** value or future financial level you want to get after the last payment  
**Type** is the number 0 or 1 indicates when the payment takes place 1- payment in advance, 0-payment of arrears.

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### ❖ **Stdev():**

- **STDEV** function returns the standard deviation for data that represents a sample. To calculate the standard deviation for an entire population, use STDEVP or STDEV.P.



- **Syntax:**

`=STDEV (number1, [number2], ...)`

- **Arguments:**

**number1** - First number or reference in the sample.

**number2** - [optional] Second number or reference.

### ❖ **Logical Function:**

#### ➤ **If(condition, value-if-true, value-if-false) :**

- It checks the logical condition of a statement and returns one value if a condition you specify evaluates to TRUE and another value if it evaluates to FALSE.

- For Example:

**=IF(A1>10,"Over 10","10 or less")**

returns "Over 10" if A1 is greater than 10, and "10 or less" if A1 is less than or equal to 10.

#### ➤ **Nested If:**

- We can use one IF condition within another IF condition that is known as NESTED IF condition.

Percentage	Grade
>=70	Distinction
>=60 && <70	First
>=50 && <60	Second

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$\geq 35 \ \&\& \ < 50$	Third
$< 35$	Fail

=IF(C8>=75,"DIST",IF(AND(C8>=60,C8<70),"FIRST",IF(AND(C8>=50,C8<60),"SECOND",IF(AND(C8>=35,C8<50),"THIRD","FAIL"))))

### ➤ **AND(Cond1,Cond2,Cond3,...CondN):**

- Returns TRUE if all conditions are true otherwise it returns false.
- For example: =AND(12<20, 12>4, 40<69)
- Output: True

	A	B	C
1	<b>Formula</b>	<b>Description</b>	<b>Result</b>
2	=AND(TRUE,TRUE)	All arguments are TRUE	TRUE
3	=AND(TRUE,FALSE)	One argument is FALSE	FALSE
4	=AND(1=1,2=2,3=3)	All arguments are TRUE	TRUE
5	=AND(1=2,2=3,3=4)	One argument is FALSE	FALSE

### ➤ **OR(Cond1,Cond2,Cond3,...CondN):**

- Returns FALSE if all conditions are false otherwise it returns True.
- For Example : =OR(21<20, 12>4, 40<69) Output: True
- For Example : =OR(21<20,25>30) Output: False

	A	B	C
1	<b>Formula</b>	<b>Description</b>	<b>Result</b>
2	=OR(TRUE,TRUE)	All arguments are TRUE	TRUE
3	=OR(TRUE,FALSE)	One argument is FALSE	TRUE
4	=OR(1=1,2=2,3=3)	All arguments are TRUE	TRUE
5	=OR(1=2,2=3,3=4)	All arguments are FALSE	FALSE

### ➤ **NOT(Condition):**

- This function reverse the result of the given condition.
- For Example:
- Not (True)                      Output: False
- Not (False)                      Output: True

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- Not (21<25)      Output: False

	A	B	C
1	<b>Formula</b>	<b>Description</b>	<b>Result</b>
2	=NOT(FALSE)	Reverses FALSE	TRUE
3	=NOT(TRUE)	Reverses TRUE	FALSE
4	=NOT(1+1=2)	Reverses TRUE	FALSE
5	=NOT(2+2=5)	Reverses FALSE	TRUE

### ➤ **TRUE:**

- The Excel TRUE function returns the value TRUE. TRUE is classified as a compatibility function, and not needed in most cases. It is equivalent to using the Boolean value TRUE directly in a formula.

- **Syntax:**

=TRUE ()

### ➤ **FALSE:**

- The Excel FALSE function returns the value FALSE. FALSE is classified as a compatibility function, and not needed in most cases. It is equivalent to using the Boolean value FALSE directly in a formula.

- **Syntax:**

=FALSE()

### ❖ **Date and Day Function:**

#### ➤ **DATE(year, month, day):**

- This function returns the date of given data.
- Where
  - Year : must be two or four digits
  - Month: must be <=12
  - Day : must be <=31
- For example: date(2013,12,11)
- Output: 12/23/2013

#### ➤ **DAY( date):**

- Returns day values of the given date.
- For Example: =day("12/11/2013")
- 11

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### ➤ **TIME( hour, minute, second ):**

- Returns the time based on the given data.
- Where
  - Hour : Must be in between 0 to 23. If it is in between 0 to 12 then it is considered as AM otherwise PM.
- For Example: =time(11,05,20)
- Output: 11:05 A.M

### ➤ **Now():**

- This function returns the system date and time based on the format “mm/dd/yyyy hh:mm”
- For Example: =now()
- Output: 12/23/2013 13:44

### ➤ **Hour():**

- Returns the hours value of the given time
- For Example: =hour(“11:34:20 A.M.”)
- 11

### ➤ **Minutes:**

- Returns the minutes value of the given time
- For Example: =hour(“11:34:20 A.M.”)
- 34

### ➤ **Second:**

- Returns the minutes value of the given time
- For Example: =hour(“11:34:20 A.M.”)
- 34

### ➤ **Month(date):**

- Returns month values of the given date.
- For Example: =month(“12/12/2013”)
- 12

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### ➤ Days360:

- Returns the number of days between two dates based on a 360-day year.
- For example: =days360("12/23/2013","12/25/2013")
- Output: 2

### ➤ Weekday:

• WEEKDAY function takes a date and returns a number between 1-7 representing the day of week. By default, WEEKDAY returns 1 for Sunday and 7 for Saturday. You can use the WEEKDAY function inside other formulas to check the day of week and react as needed.

- **Return Value :** A number between 0 and 7.

- **Syntax:**

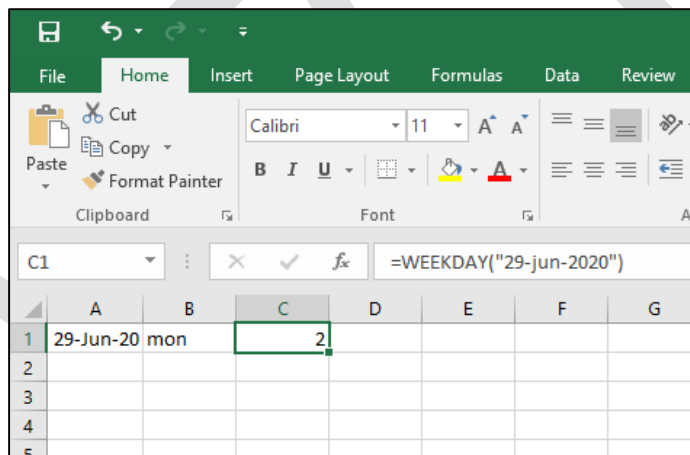
=WEEKDAY (serial\_number, [return\_type])

- **Arguments:**

**serial\_number** - The date for which you want to get the day of week.

**return\_type** - [optional] A number representing day of week mapping scheme. Default is

**Example :**



### **Data:**

#### ❖ DATA FILTER SORT:

- Filtering is a quick and easy way to find and work with a subset of data in a range.

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- A filtered range displays only the rows that meet the criteria (criteria: Conditions you specify to limit which records are included in the result set of a query or filter.) you specify for a column.
- Microsoft Excel provides two commands for filtering ranges:
  - AutoFilter.
  - Advanced Filter.
- Filtering temporarily hides rows you do not want displayed.
- When Excel filters rows, you can edit, format, chart, and print your range subset without rearranging or moving it.

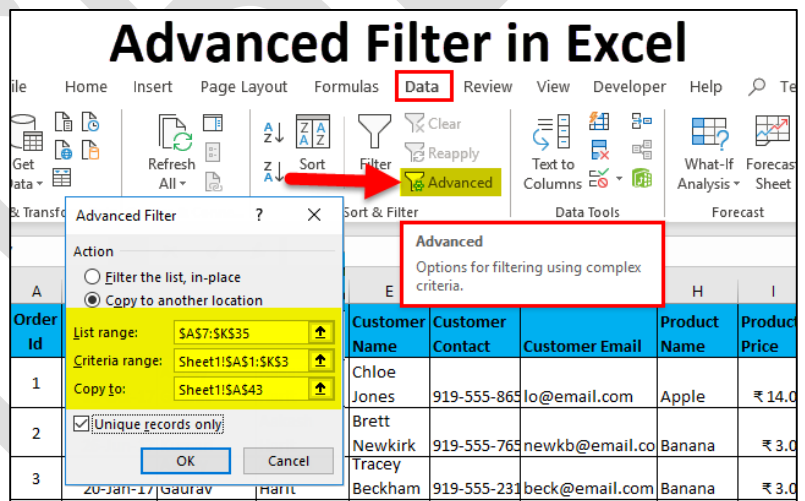
### ➤ AUTO FILTER

- When you use the AutoFilter command, AutoFilter arrows appear to the right of the column labels in the filtered range.
- Microsoft Excel indicates the filtered items with blue.

### ➤ ADVANCED FILTER

With Auto filtering , user can only apply the condition for individual fields but when we want to make the combination of fields in condition then advance filtering option is used.

- Prepare Criteria Range based on the condition.
- From the Data menu, choose Filter, Advanced Filter.
- On the open dialog box ( See on right side) Select the **List Range** where you apply filter.
- Then select **Criteria Range** – What you want to find out.
- If you want to copy these records into another location then select “**Copy to another location**” and select the range to copy records.





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- Press “OK” button
- **For Example:**
- On the above database , we want the records where total > 500 .
- Set Criteria Range in F1 : F2 cell .
- See the above image of Advance Filtering for how advance filtering apply in this case.

	A	B	C	D	E	F
1	Date	Customer	Product	Total		Total
2	1-Jan-01	MegaMart	Cookies	\$278.07		>500
3	3-Jan-01	MiniMart	Bread	\$1,891.58		
4	3-Jan-01	SuperMart	Produce	\$1,365.35		
5	3-Jan-01	FoodMart	Produce	\$240.17		
6	4-Jan-01	MegaMart	Cookies	\$1,348.49		
7	11-Jan-01	FoodMart	Produce	\$2,023.35		
8	11-Jan-01	MegaMart	Produce	\$292.81		

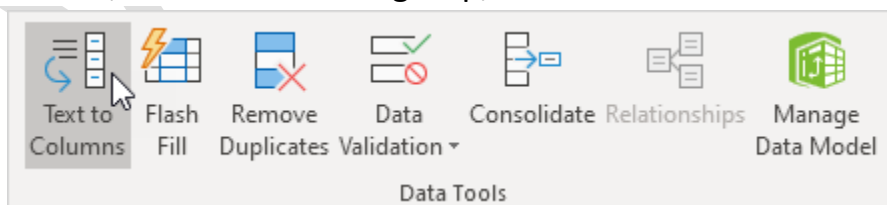
### ❖ **SORTING**

- When you enter data into your worksheet it is often unorganized making it difficult to examine.
- When analyzing the information in your spreadsheet, you may need to rearrange the data in different ways to answer different questions.
- Excel's sorting feature can help your rearrange your data so you can use it more efficiently.
- To apply a sort in Excel, highlight the data that you wish to sort.
- **Under the Data menu, select Sort.**

### ❖ **Text to Columns conversation:**

To separate the contents of one Excel cell into separate columns, you can use the 'Convert Text to Columns Wizard'. For example, when you want to separate a list of full names into last and first names.

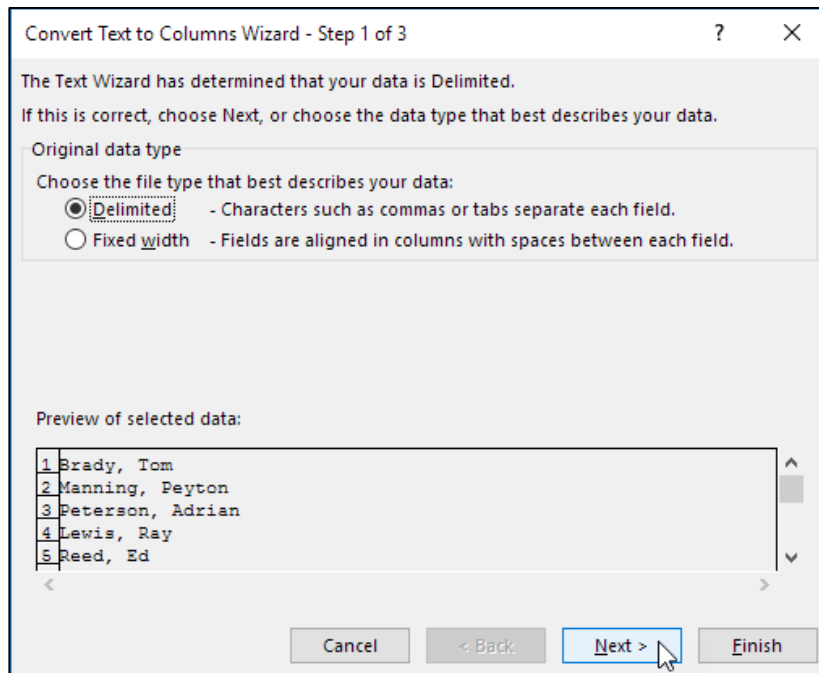
1. Select the range with full names.
2. On the Data tab, in the Data Tools group, click Text to Columns.



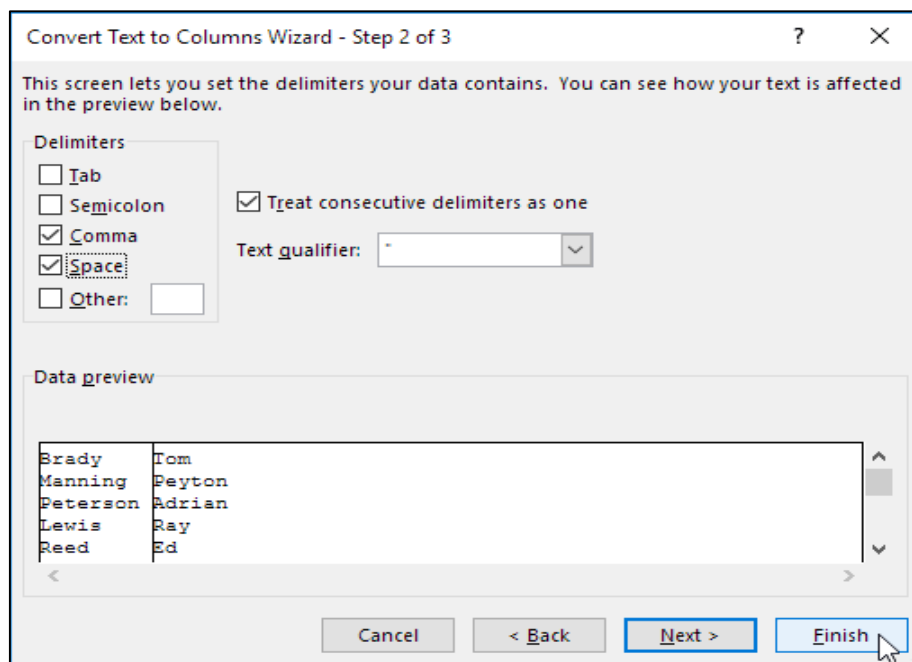
The following dialog box appears.

3. Choose Delimited and click Next.

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4. Clear all the check boxes under Delimiters except for the Comma and Space check box.



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### 5. Click Finish

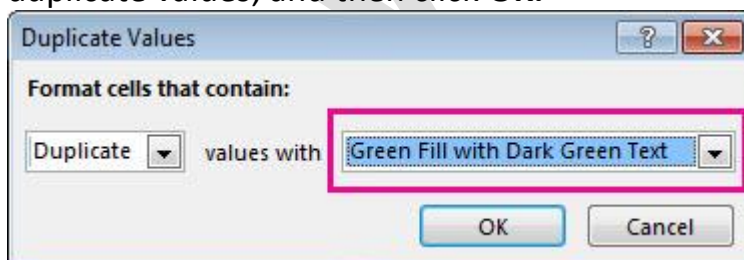
	A	B	C	D	E	F	G	H
1	Brady	Tom						
2	Manning	Peyton						
3	Peterson	Adrian						
4	Lewis	Ray						
5	Reed	Ed						
6	Polamalu	Troy						
7	Johnson	Andre						
8	Revis	Darrelle						
9	Brees	Drew						
10	Peppers	Julius						
11								

#### ❖ Remove Duplicate data in worksheet:

Sometimes duplicate data is useful, sometimes it just makes it harder to understand your data. Use conditional formatting to find and highlight duplicate data.

There is a way you can review the duplicates and decide if you want to remove them.

1. Select the cells you want to check for duplicates.
2. Click **Home > Conditional Formatting > Highlight Cells Rules > Duplicate Values**.
3. In the box next to **values with**, pick the formatting you want to apply to the duplicate values, and then click **OK**.



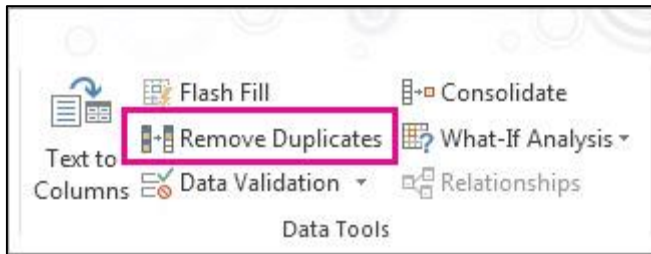
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### → Remove Duplicate Values:

When you use the **Remove Duplicates** feature, the duplicate data will be permanently deleted. Before you delete the duplicates, it's a good idea to copy the original data to another worksheet so you don't accidentally lose any information.

- **Steps to remove duplicate data:**

1. Select the range of cells that has duplicate values you want to remove.
2. Click **Data > Remove Duplicates**, and then Under **Columns**, check or uncheck the columns where you want to remove the duplicates.

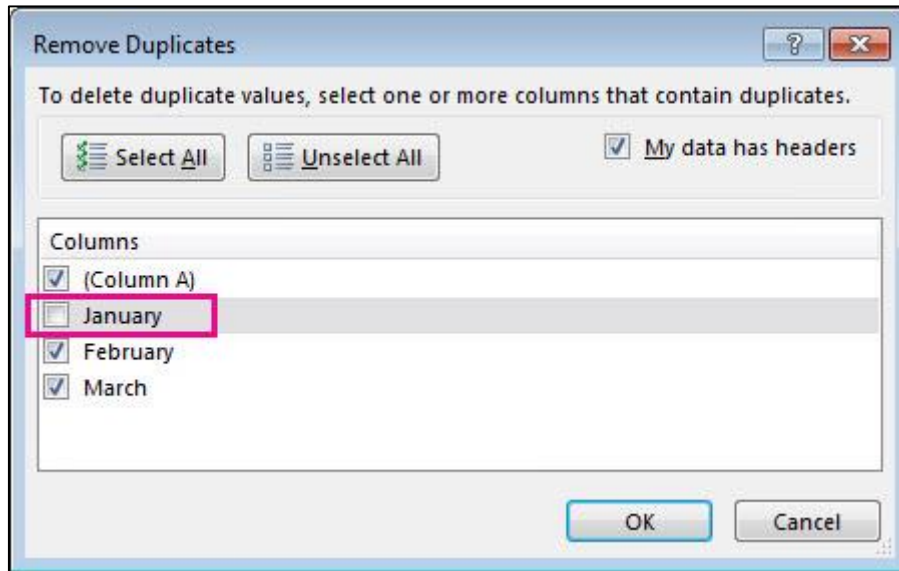


3. For example, in this worksheet, the January column has price information I want to keep.

	A	B	C	D
1	Name	Price each month		
2		January	February	March
3	Entrenching Tool	\$0.00	\$32.00	\$43.00
4	Biker Fuel Energy Bar	\$0.00	\$5.00	\$5.00
5	Biker Fuel Energy Bar	\$0.00	\$12.00	\$18.00
6	No-Hands Riding Kit	\$250.00	\$220.00	\$180.00
7	Combination Lock	\$30.00	\$20.00	\$15.00
8	Key Lock	\$0.00	\$11.00	\$22.00
9	Standard Locking Chain	\$0.00	\$26.00	\$25.00
10	Deluxe Locking Chain	\$0.00	\$55.00	\$53.00
11	Executive Locking Chain	\$0.00	\$85.00	\$99.00
12	Entrenching Tool	\$0.00	\$32.00	\$43.00
13	Biker Fuel Energy Bar	\$0.00	\$5.00	\$5.00
14	Biker Fuel Energy Bar	\$0.00	\$12.00	\$18.00
15	No-Hands Riding Kit	\$250.00	\$220.00	\$180.00
16				

So, I unchecked **January** in the **Remove Duplicates** box.

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4. Click **OK**.

### ❖ Consolidate Data:

- **Definition:** It is a method of bringing together source data from many worksheet locations, applies one of several functions and then display the information in Master sheet.
- It is used to summarise data from multiple worksheets into a single worksheet.
- For example, the expenses from different offices can be totaled on another worksheet.
- The link between consolidate file and source file can be possible to save all updated information of source file is called Linked Consolidation.
- Source data range must include row/column heading.
- The label in source area that don't match any label in other source area are displayed in separate row/column.

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### Step of Data Consolidation

- **Open all source file in same window and minimize** them if source range in different workbooks.

- **Select the cell of the destination/Master file** where you want to display the consolidate result.

- Click tab **Data ----> Consolidate**

- The Consolidate dialogue box appears

- **Click the Function list arrow** and select the function you want to use to summarise the data.

- **Click in the Reference field**, click the worksheet tab, and then select the first range of data to consolidate. If the range of data is located on a different workbook, click the Browse button and locate the file

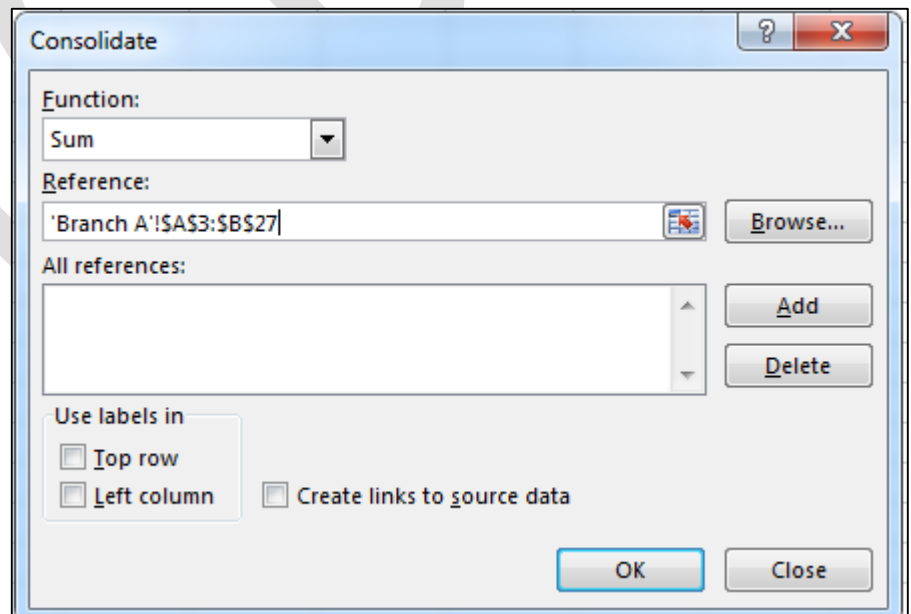
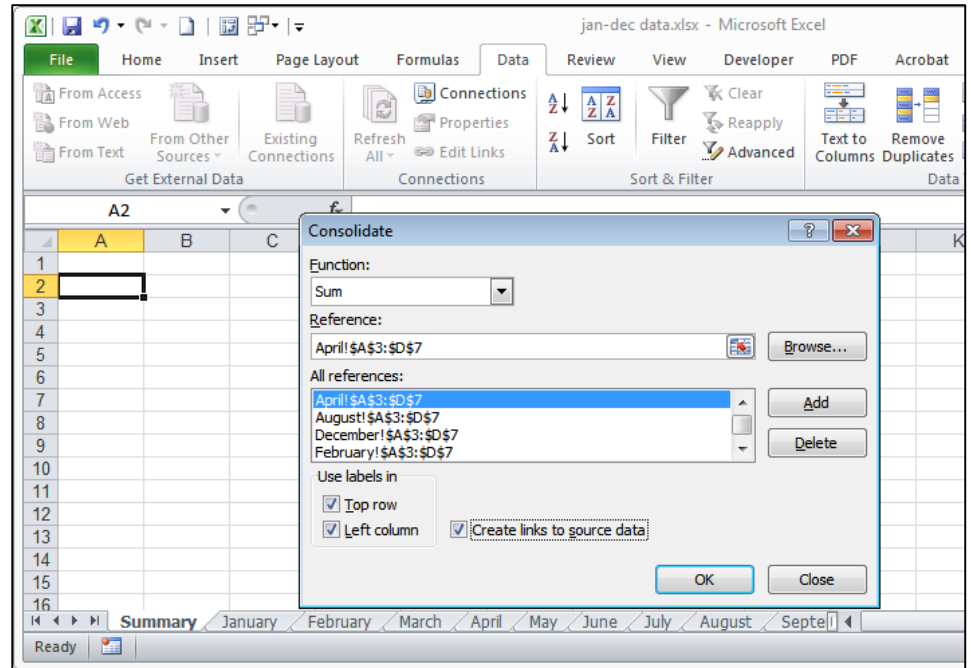
- **Click the Add button.**

- Repeat steps 4 and 5 to select all the ranges you want to consolidate.

- To copy the labels to the consolidated worksheet, click the Top row or Left column options.

**Click the Create links to source data** checkbox if you want the consolidation to automatically update, whenever the source ranges change.

- **Click Ok.**

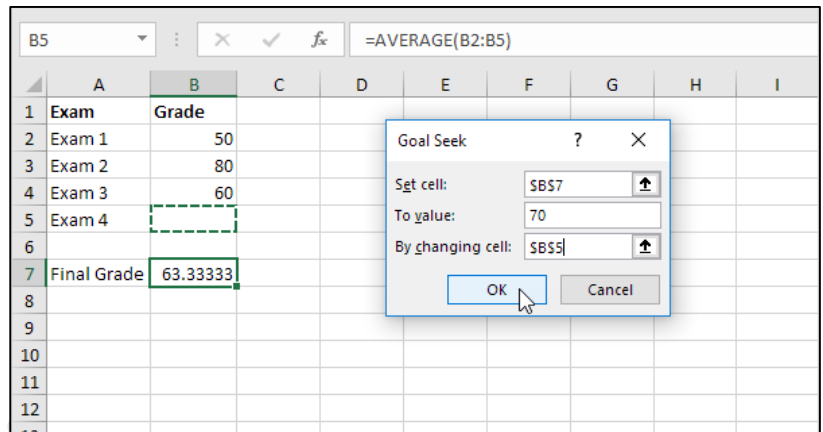


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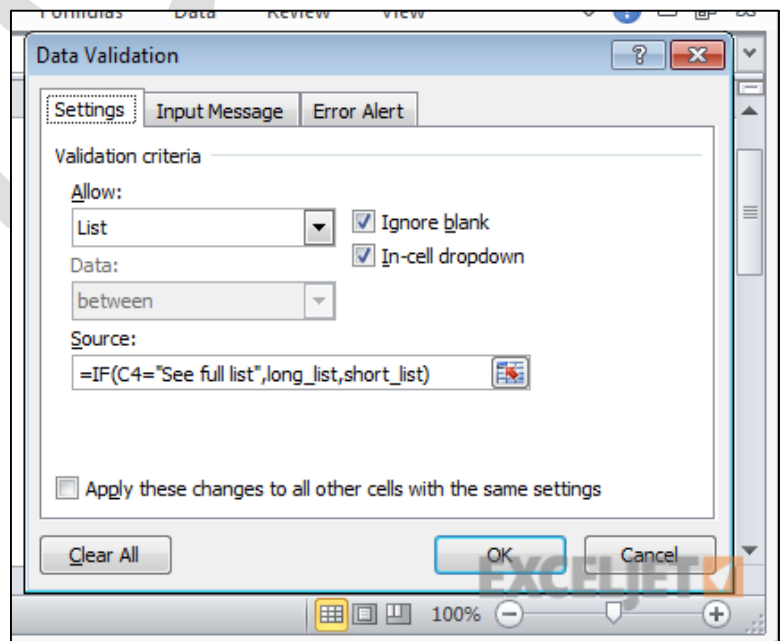
### GOAL SEEK:

- When user knows the result but does not know the input at this time Goal Seek Method is useful.
  - Through Goal Seek function user gets result by adjusting value automatically.
  - Goal seek tells you what inputs you need to give in order to get certain output.
  - It is a part of What – if analysis command in excel 2007.
  - To understand it, we will use Goal Seek to find a number to make the sum equal to 100.
    - C2=25,C3=40,C4=
- sum(c2:c3)
- Click on Tool tab → Goal Seek.
  - In Goal Seek,
    - **Set cell :** Click on C4
    - **To Value:** Enter 100
    - **By Changing Cell :** Click on C3
  - The sum in C4 should be 100 and the value in Cell should be 75.



### DATA VALIDATION:

- Data Validation allows you to specify what data is valid for a range of cells, helping to prevent errors on data entry.
- Data Validation also enables the creation of messages to assist the user when entering data and warn them of incorrect entries.
- Using Data Validation you can create lists of items for the user to select from. This will prevent spelling mistakes, typos and usually speed up data entry.



#### ➤ To use Data Validation to attach text to a cell, do the following:

- Select the cell.



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- In Excel 2003, choose Validation from the Data menu.
- The Data Validation dialogue box appears.

Click the drop list arrow for the **Allow** field and select **List**

- In the **Source** field, either type the entries for the list separated by commas, or select the range of cells holding the required entries
- Ensure the **In-cell dropdown** checkbox is checked so that the list appears as a drop down menu
- Click **Ok**
- Data Validation is applied to the selected cells.



Now when the user clicks on a cell to enter data, the list of entries will appear.

If the user types an entry into a validated cell that does not match an entry in the list,

the Data Validation error message appears.

### ➤ Data Validation Message

- In the resulting dialog box, **click the Input Message tab.**
- **Enter a title and message.** The title isn't necessary; you can omit it if you like. Notice that Excel checks the Show Input Message When Cell Is Selection option by default. For this technique to work, you must check this option.
- Click the **Error Alert** tab
- Select a Style, Title and enter an Error message.
- Ensure the **Show error alert after invalid data is entered** check box is checked so that data entries are validated. This can be unchecked if you want the functionality of the list, but would like users to be able to enter items that are not in the list
- Click OK.





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### **CELL REFERENCE:**

- **Definition:** A cell's location in the spreadsheet is referred to as its Cell Reference.
- Used in a formula so that Microsoft Office Excel can find the values or data that you want that formula to calculate.
- Excel uses three types of cell references to create formulas. Each has its own purpose.

- Absolute Cell Reference
- Relative Cell Reference
- Mixed Reference

#### ➤ **Absolute Cell Reference**

- The absolute **reference means address becomes fixed** even if user drag the data.
- There will likely be instances when you want to use a constant in a formula.
- In this case, you would use an absolute cell reference.
- When a formula containing an absolute cell reference is copied to a new location, the cell reference is not adjusted.

• **To create an absolute cell reference, you will need to add dollar signs ( \$ ) in front of the column and row elements for the cell referenced.**

- In this example, we are calculating a constant 5% increase in total costs.
- The amount of the increase is located in cell C1, so we want that portion of the formula to remain absolute. When we copy the formula to column C, the only cell number that changed was B7 to C7, while the \$C\$1 cell remained constant in the copy process.

	A	B	C
1	Costs	Fall	Spring
2	Tuition	10,000	10,000
3	Housing	5,000	5,000
4	Books	1,000	700
5	Spending	1,500	1,000
6	TOTAL	17,500	16,700
7	Total Increase	875	=C\$1*B7

#### ➤ **Relative Reference**

- Relative reference means **the address which can be relatively changed when the cell is dragged to next row or column.**
- When you copy formulas in Excel, the application will adjust the formulas so that the cell references are changed relative to their new location. These adjusting

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references are known as relative cell references. Excel is copying the formula relative to where you are and where you are going.

- Below is an example of a copied formula, using relative references.
- This example shows that the original formula, in cell B6 was =SUM(B2:B5).
- This formula was copied one cell to the right, so Excel automatically updated the formula using a relative reference to reflect the new cell address, making the new formula =SUM(C2:C5).

	A	B	C
1	Costs	Fall	Spring
2	Tuition	10,000	10,000
3	Housing	5,000	5,000
4	Books	1,000	700
5	Spending	1,500	1,000
6	TOTAL	17,500	=SUM(C2:C5)

	A	B
1	A\$1	B\$1
2	A\$1	

### ➤ Mixed Reference

- Two possibilities are there
  - Row is absolute and Column is relative
  - Column is absolute and Row is relative

#### **Row is absolute and Column is relative**

- When user drag the cell to next column then the cell address is changed otherwise it remains same.
- Eg. : A\$1

	A	B
1	\$A1	\$B1
2	\$A2	

#### **Column Absolute Row Relative**

- When user drag the cell to next row then the cell address is changed otherwise it remains same.
- Eg. : \$A1

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### **ERROR:**

There are following types of error occurs during function execution in excel.

ERROR	DESCRIPTION	SOLUTION
#####	<p>Sometimes referred to as “<b>Railroad tracks</b>”. This error can be caused by several conditions:</p> <ul style="list-style-type: none"> <li>A number in a <u>cell</u> is too wide for the cell to display it.</li> <li>The <u>formula</u> in the cell produces a result that is too wide for the cell.</li> <li>There is a negative number in the cell that has been formatted for dates or times. Dates and times in Excel must be positive values.</li> </ul>	<ul style="list-style-type: none"> <li><u>Widen the column</u> containing the problem cell.</li> <li>Change the format of the problem cell to something other than a date/time format.</li> <li>Correct the negative number in a date/time formatted cell.</li> </ul>
#DIV/0	<p><b>Divide by 0 errors</b> occur when:</p> <ul style="list-style-type: none"> <li>A formula attempts to divide by zero.</li> <li>While dividing, a formula references a cell that is blank.</li> </ul> <p><b>EX:</b> 10/0</p>	<ul style="list-style-type: none"> <li>Check that you have the correct data in the cells referenced in the formula.</li> <li>Check that your data is in the correct cells.</li> </ul>
#REF!	<p><b>Invalid cell reference errors</b> occur when a spreadsheet formula contains incorrect cell references.</p> <p><b>This happens most often when:</b></p> <ul style="list-style-type: none"> <li>Columns or rows containing data used in the formula are accidentally deleted.</li> <li>A formula has been moved or copied to another cell and the cell references are incorrect.</li> <li>Data used in a formula has been moved, leaving the function or formula with incorrect cell references</li> </ul>	<ul style="list-style-type: none"> <li>Use the undo feature to recover lost data</li> <li>Correct the cell references for formulas that have been copied or moved.</li> <li>Correct the cell references for formulas when the data has been moved.</li> </ul>
#NULL	<p><b>#NULL!</b> errors occur when the two or more <u>cell references</u> are separated incorrectly in a <u>formula</u>. Such as:</p> <ul style="list-style-type: none"> <li>if multiple cell references in a formula are separated by a space instead of a <u>mathematical operator</u> such as a plus sign ( + ).</li> </ul>	<p>Separate multiple cell references correctly.</p> <ul style="list-style-type: none"> <li>Use a comma is correctly used to separate cells in a <u>function</u> e.g. = <b>SUM(D1, D2, D3, D4)</b></li> <li>The start and end points of a range in a function are correctly separated by a colon ( : )</li> </ul>

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	<ul style="list-style-type: none"> <li>if the start and end points of cell <u>ranges</u> are not separated by a colon (:)</li> </ul>	<p><b>e.g. = SUM(D1:D4).</b></p> <ul style="list-style-type: none"> <li>A mathematical operator, such as a plus or minus sign is used to separate cell references in a formula e.g. = <b>D1 + D2 + D3 + D4.</b></li> </ul>
#NUM!	<p>Occurs with invalid numeric values in a formula or function.</p> <p><b>For example:</b> All square numbers are positive, so there is no such thing as a square root of a negative number. Therefore, the Excel function <b>SQRT(-2)</b> will generate the #NUM! error, to indicate the invalid negative number argument to the square root function.</p>	<p>To check each of the numeric arguments in your formula.</p>
#NAME!	<p>When Excel encounters text in a formula, it will try to interpret that text as a reference, a named range, or a function name. If the text is not recognised as any of these, the #NAME? error will be generated.</p> <p><b>For Example:</b> For example, if you intended to type in the function =SUM(B1:C2), but you accidentally type =<b>SM(B1:C2)</b>, <u>Excel will fail to recognise the function name "SM" and so will generate the #NAME? error.</u></p>	<ul style="list-style-type: none"> <li>To check your function names, references and named ranges have the correct spellings, and check that any variables that are meant to be text values are entered in double quotes.</li> <li>If your formula contains nested functions, check the results of these individually, until you identify the source of the error.</li> </ul>