

1. Draw a simple bar diagram to represent the following figures relating to manufacturing of machines.

Years	2000	2001	2002	2003	2004
No. of machines	1200	1700	1900	2800	2100

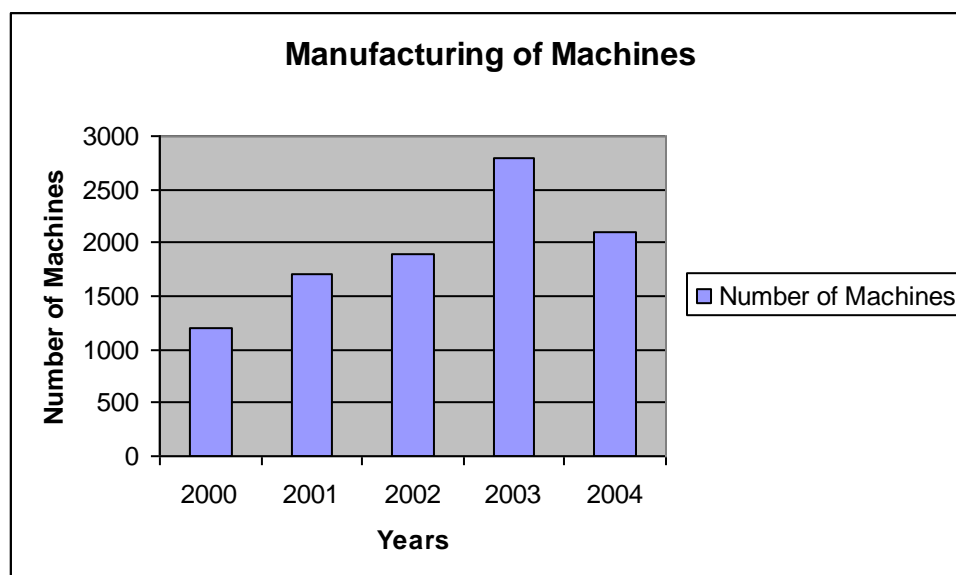
**STEPS:**

1. Open the Excel Sheet.
2. Place the cursor in A1 cell and write as “Years”. Then write the given years from A2 to A6.
3. Place the cursor in B1 cell and write as “No. of Machines”. Then write the given values from B2 to B6.
4. Select the Data from ‘B1’ to ‘B6’.
5. Then follow the following command INSERT>CHART>COLUMN (chart type)>SUB TYPE 2 > NEXT.
6. Data range is already selected. Click on SERIES option and enter in the category X axis labels as 2000, 2001, 2002, 2003 and 2004.
7. Click on Next button.
8. Click on TITLES and enter Chart title as “Manufacturing of Machines”, Category (X) axis as “Years”, and Value (Y) axis as “No. of Machines”.
9. Click on NEXT option and click on Finish button.

**INPUT:**

	A	B
1	Years	Number of Machines
2	2000	1200
3	2001	1700
4	2002	1900
5	2003	2800
6	2004	2100

**OUTPUT:**



2. The following table gives the result of B.Com students of a college for Four year. Draw a multiple bar diagram from the following data:

<i>Year</i>	<i>First Division</i>	<i>Second Division</i>	<i>Third Division</i>
1993	10	30	50
1994	12	45	70
1995	14	50	60
1996	11	40	75

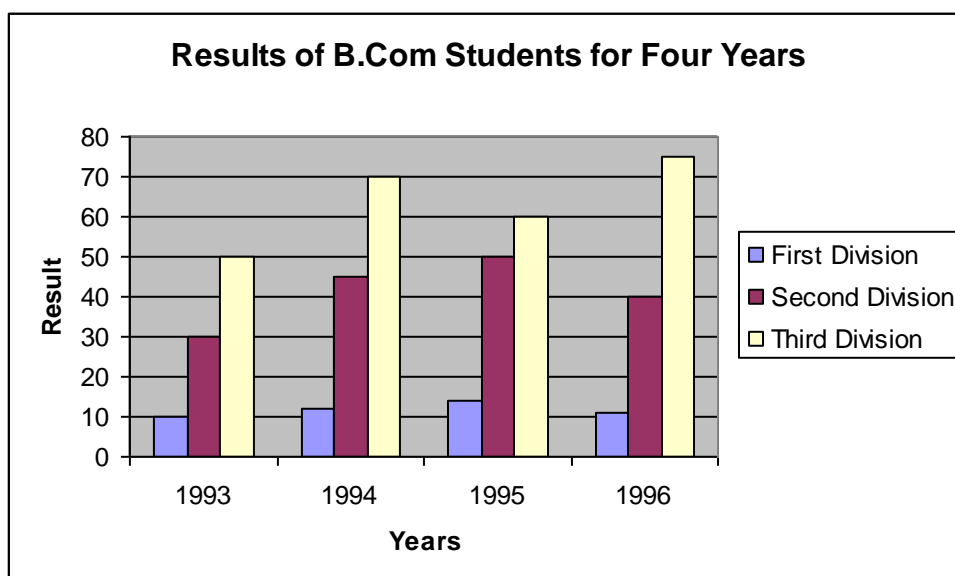
**STEPS:**

1. Open the Excel Sheet
2. Enter the heading “Years, First Division, Second Division, Third Division” in the First Row.
3. Enter the data for “Years, First Division, Second Division, Third Division” as given in the question.
4. Select the data from ‘B1:B5 to D1:D5’.
5. Click on ‘INSERT’ on the menu bar and from the dropdown menu click on CHART option.
6. Select the chart type ‘column’ and select the required chart sub type.
7. Click on next button
8. Data range is already selected. Click on SERIES option and enter in the category X axis labels as 1993, 1994, 1995, 1996.
9. Click on Next button.
10. Click on TITLES and enter Chart title as “Results of B.Com Students for Four Years”, Category (X) axis as “Years”, and Value (Y) axis as “Result”.
11. Click on NEXT option and click on Finish button.

**INPUT:**

	A	B	C	D
1	Year	First Division	Second Division	Third Division
2	1993	10	30	50
3	1994	12	45	70
4	1995	14	50	60
5	1996	11	40	75

**OUTPUT:**



3. The following data relate to the monthly expenditure (in rupees) of two families A and B.

Items of expenditure	Expenditure in Rs.	
	Family – A	Family – B
Food	1600	1200
Clothing	800	600
Rent	600	500
Light	400	200
Fuel	800	600

Represent the above data by a suitable percentage diagram.

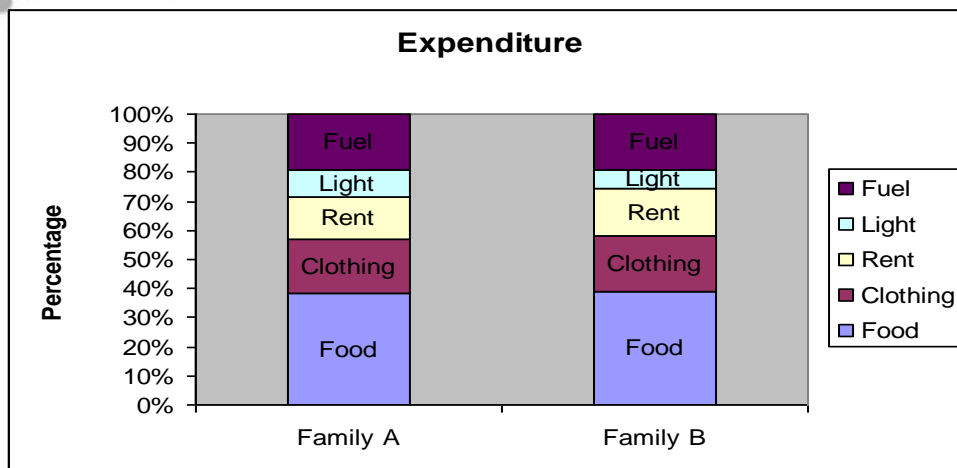
**STEPS:**

1. Open Excel Sheet.
2. Enter 'Items of Expenditure' in A1 cell and items from A2 to A6 cells.
3. Enter 'Family A' in B1 cell and values from B2 to B6 cells.
4. Enter 'Family B' in C1 cell and values from C2 to C6 cells.
5. Select the range of data from A1,A6 to C1,C6.
6. Then follow the following command INSERT>CHART>chart type COLUMN>chart sub type 3> NEXT>ROWS radio button>NEXT.
7. Enter the title 'Expenditure' in the TITLE option.
8. Enter 'Percentage' in Value (Y) Axis.
9. Click On 'DATA LABELS' and Select 'Series Name'.
10. Click On 'GRIDLINES' and remove the tick mark from major gridlines.
11. Click on Next option and click on Finish button.

**INPUT:**

	A	B	C
1	Items of Expenditure	Family A	Family B
2	Food	1600	1200
3	Clothing	800	600
4	Rent	600	500
5	Light	400	200
6	Fuel	800	600

**OUTPUT:**



**4. Create a Pie diagram to represent the following data of profits of HLT Ltd:**

<b>Years</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
<b>Profits</b>	<b>5,000</b>	<b>10,000</b>	<b>25,000</b>	<b>30,000</b>	<b>20,000</b>

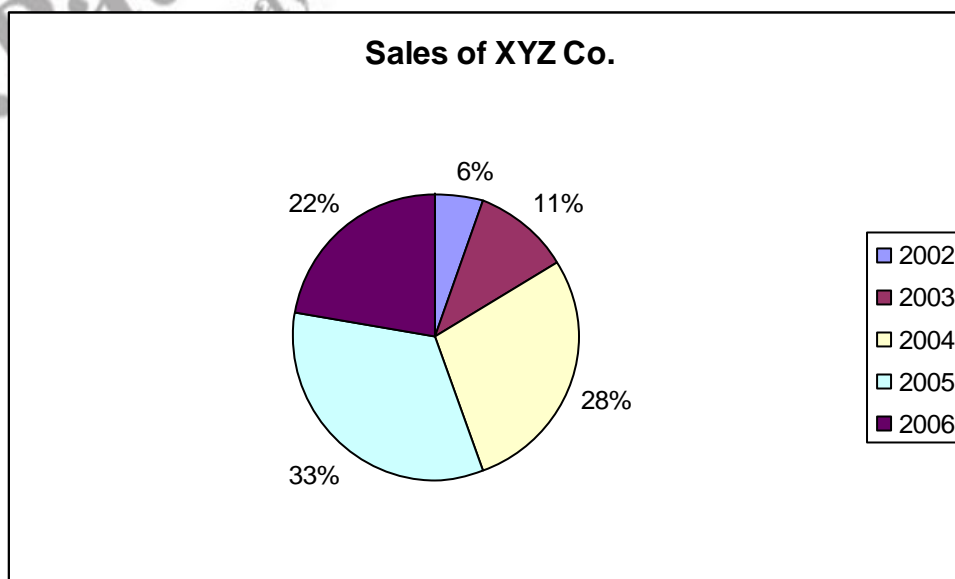
**STEPS:**

1. Open Excel Work Sheet.
2. Enter the Column heading as 'YEAR' in the A1 cell and enter the given values from A2 to A6.
3. Enter the Column heading as 'PROFITS' in the B1 cell and enter the given sales from B2 to B6 cells.
4. Select the range from 'B2 to B7'.
5. Then Apply the following Command **INSERT>CHART>PIE (chart type)>SUB TYPE 1 > NEXT.**
6. Click on 'Series' tab.
7. In the 'Category Labels' enter 2002,2003,2004,2005,2006 or select the range from A4 to A8.
8. Click on Next.
9. Click on 'Title' and enter the chart title 'Sales of XYZ Co.'
10. Click on 'Data labels and click on 'percentage' radio button.
11. Select next and then click finish.

**INPUT:**

	<b>A</b>	<b>B</b>
<b>1</b>	<b>YEAR</b>	<b>PROFITS</b>
<b>2</b>	<b>2002</b>	<b>5000</b>
<b>3</b>	<b>2003</b>	<b>10000</b>
<b>4</b>	<b>2004</b>	<b>25000</b>
<b>5</b>	<b>2005</b>	<b>30000</b>
<b>6</b>	<b>2006</b>	<b>20000</b>

**OUTPUT:**



5. The following table shows the net revenue earned by railways during Nine years period as given below:

Year	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
Amount	227	127	403	554	379	270	686	581	721

Draw a line diagram from the above data.

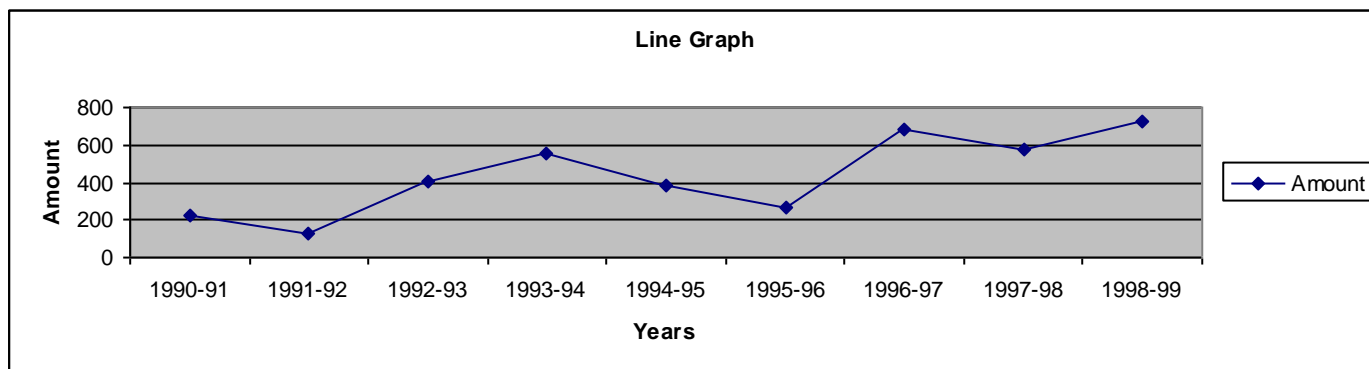
**STEPS:**

1. Open the Excel Work Sheet.
2. Enter the heading 'Line Graph in the First Row.
3. Enter the column heading 'YEAR' in A2 cell and the years as given in the question from A3 to A11 cells.
4. Enter the column heading 'AMOUNT' in B2 cell and the values as given in the question from B3 to B11 cells.
5. Select the Range of Data from A2,A11 to B2,B11.
6. Then Apply the following Command INSERT>CHART>chart type LINE>chart SUB TYPE 1 >NEXT>NEXT.
7. Click on TITLES and enter Chart title as 'Line Graph', Category (X) axis as 'Years' and Value (Y) axis as 'Amount'
8. Click on 'Next' option and click on 'Finish' button.

**INPUT:**

Year	Amount
1990-91	227
1991-92	127
1992-93	403
1993-94	554
1994-95	379
1995-96	270
1996-97	686
1997-98	581
1998-99	721

**OUTPUT:**



**6. Find Arithmetic mean for the following figures:**

30	41	47	54	23	34	37	51	53	47
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**STEPS:**

1. Open Excel Worksheet.
2. Enter the Column heading as 'Values' in the A1 cell and values from A2 to A11.
3. Then place the cursor in A12 cell and write as 'Arithmetic Mean =' in A12 cell.
4. Then place the cursor in B12 cell and write the formula =AVERAGE(A2:A11) and press enter.

**INPUT & OUTPUT:**

	A	B
1	Values	
2	30	
3	41	
4	47	
5	54	
6	23	
7	34	
8	37	
9	51	
10	53	
11	47	
12	Arithmetic Mean =	41.7

**7. Calculate Arithmetic mean from the following data.**

<b>Marks</b>	<b>4</b>	<b>8</b>	<b>12</b>	<b>16</b>	<b>20</b>
<b>No of students</b>	<b>6</b>	<b>12</b>	<b>18</b>	<b>15</b>	<b>9</b>

**STEPS:**

1. Open Excel Worksheet
2. Enter the Column heading as 'Marks (X)' in the A1 cell and values from A2 to A6.
3. Enter the Column heading as 'No. of Students (f)' in the B1 cell and enter the values from B2 to B6.
4. Enter the Column heading as 'fX' in the C1 cell and then place the cursor in C2 cell and write the formula =A2\*B2 and press enter. Then by using fill handle drag and copy the formula in the required cells.
5. Place the cursor in A7 cell and write as 'N=' and then place the cursor in B7 cell and write the formula =SUM(B2:B6) and press enter.
6. Place the cursor in A8 cell and write as ' $\sum fX$  =' and then place the cursor in B8 cell and write the formula =SUM(C2:C6) and press enter.
7. Place the cursor in A9 cell and write as 'Arithmetic Mean =' and then place the cursor in B9 cell and write the formula =B8/B7 and press enter.

**NOTE:**

$$\text{Arithmetic Mean} = \frac{\sum fX}{N}$$

### INPUT & OUTPUT:

	A	B	C
1	Marks (X)	No. Of Students (f)	fX
2	4	6	24
3	8	12	96
4	12	18	216
5	16	15	240
6	20	9	180
7	N =	60	
8	$\sum fX =$	756	
9	Arithmetic Mean =	12.6	

### 8. Find Arithmetic mean for the following frequency distribution:

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No of students	10	20	50	60	40	20

#### STEPS:

1. Open Excel Worksheet
2. Enter the heading 'Calculation of Arithmetic Mean' in the first row.
3. Enter the Column heading as 'Marks (X)' in the A1 cell and values from A2 to A7.
4. Enter the Column heading as 'No. of Students (f)' in the B1 cell and values from B2 to B7.
5. Enter the Column heading as 'Mid Point (m)' in the C1 cell and enter the mid values of Class Intervals manually from C2 to C7.
6. Place the cursor in the cell D1 and write as 'fm' and then place the cursor in D2 cell and write the formula =B2\*C2 and press enter. Then by using fill handle drag and copy the formula in the required cells.
8. Place the cursor in A8 cell and write as 'N=' and then place the cursor in B8 cell and write the formula =SUM(B2:B7) and press enter.
9. Place the cursor in A9 cell and write as ' $\sum fm =$ ' and then place the cursor in B9 cell and write the formula =SUM(D2:D7) and press enter.
7. Place the cursor in A10 cell and write as 'Arithmetic Mean =' and then place the cursor in B10 cell and write the formula =B9/B8 and press enter.

#### NOTE:

$$\text{Arithmetic Mean} = \frac{\sum fm}{N}$$

### INPUT & OUTPUT:

	A	B	C	D
1	Marks (x)	No. Of Students (f)	Mid Point (m)	fm
2	0 to 10	10	5	50
3	10 to 20	20	15	300
4	20 to 30	50	25	1250
5	30 to 40	60	35	2100
6	40 to 50	40	45	1800
7	50 to 60	20	55	1100
8	N =	200		
9	$\sum fm =$	6600		
10	Arithmetic mean =	33		

9. From the following data of the weekly wages of 9 workers compute the median wage.

170	190	210	130	160	180	240	220	200
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**STEPS:**

1. Open Excel Worksheet.
2. Enter the Column heading as 'Median values' in the A1 cell and write the given values from A2 to A10.
3. Place the cursor in A11 cell and write 'Median =' and then place the cursor in B11 cell and write the formula =MEDIAN(A2:B10) and press enter.

**INPUT & OUTPUT:**

	A	B
1	Median values	
2	170	
3	190	
4	210	
5	130	
6	160	
7	180	
8	240	
9	220	
10	200	
11	Median =	190

10. From the following data find the value of Median.

X:	10	20	30	40	50	60	70
F:	4	7	21	34	25	12	3

**STEPS:**

1. Open Excel Worksheet.
2. Enter the Column heading as 'Values (X)' in the A1 cell and enter the values from A2 to A8.
3. Enter the Column heading as 'Frequency (f)' in the B1 cell and enter the values from B2 to B8.
4. Enter the Column heading as 'C.F' (that represents Cumulative Frequency).
5. Place the cursor in A9 cell and write as 'N=' and then place the cursor in B9 cell and write the formula =SUM(B2:B8) and press enter.
6. Place the cursor in C2 cell and write the formula =0+B2 and press enter. Then place the cursor in C3 cell and write the formula =B2+C3 and press enter. Using fill handle drag and copy the formula in the required cells.
7. Place the cursor in A10 cell and write as 'Median = Size of  $[(N+1)/2]^{\text{th}}$  item =' and then place the cursor in B10 cell and write the formula = (B9+1)/2 and press enter.
8. Place the cursor in A10 cell and write as 'Median = Size of 53.5<sup>th</sup> item = 66'.



## INPUT & OUTPUT:

	A	B	C
1	Values (X)	Frequency (f)	C.F
2	10	4	4
3	20	7	11
4	30	21	32
5	40	34	66
6	50	25	91
7	60	12	103
8	70	3	106
9	N=	106	
10	Median = Size of $[(N+1)/2]^{\text{th}}$ item =	53.5	
11	Median = Size of 53.5 <sup>th</sup> item = 66.		

### 11. Calculate the median of the following distribution:

Length in inches	0-20	20-40	40-60	60-80	80-100	100-120	120-140	140-160
No. of units	1	14	35	85	90	45	18	2

#### STEPS:

1. Open Excel Worksheet.
2. Enter the Column heading as 'Length in Inches' in the A1 cell and enter the values from A2 to A9.
3. Enter the Column heading as 'Frequency (f)' in the B1 cell and enter the values from B2 to B9.
4. Enter the Column heading as 'C.F' (that represents Cumulative Frequency).
5. Place the cursor in A10 cell and write as 'N=' and then place the cursor in B10 cell and write the formula =SUM(B2:B9) and then press enter.
6. To calculate C.F place the cursor in C2 cell and enter the formula =0+2 and press enter.
7. Now place the cursor in the C3 cell and enter the formula =C2+B3 and press enter. Then by Using Fill handle drag and copy the formula in the remaining cells.
8. Place the cursor in A11 cell and Write "(N/2) =", then place the cursor in B11 cell and write the formula =B10/2 and press enter.
9. Place the cursor in A12 cell and write "L1 =", then place the cursor in B12 cell and enter 80.
10. Place the cursor in A13 cell and write "L2 =", then place the cursor in B13 cell and enter 100.
11. Place the cursor in A14 cell and write "L2-L1 =", then place the cursor in B14 cell and write the formula =B13-B12 and press enter.
12. Place the cursor in A15 cell and write "cf =", then place the cursor in B15 cell and enter 135.
13. Place the cursor in A16 cell and write "(N/2) - cf =", then place the cursor in B16 cell and write the formula =B11-B15 and press enter.
14. Place the cursor in A17 cell and write "f =", then place the cursor in B17 cell and enter 90.
15. Place the cursor in A18 cell and write "Median =", then place the cursor in B18 cell and write the formula =B12+(B16\*B14)/B17 and press enter.

Note: Formula of Median is  $M = L1 + \frac{(N/2 - cf)}{f} * (L2 - L1)$

## INPUT & OUTPUT:

	A	B	C
1	Length in Inches	No. of units (f)	C.F
2	0 to 20	1	1
3	20 to 40	14	15
4	40 to 60	35	50
5	60 to 80	85	135
6	80 to 100	90	225
7	100 to 120	45	270
8	120 to 140	18	288
9	140 to 160	2	290
10	N=	290	
11	(N/2) =	145	
12	L1 =	80	
13	L2 =	100	
14	L2 - L1	20	
15	cf =	135	
16	(N/2) - cf	10	
17	f =	90	
18	Median =	82.22222222	

12. Find Mode from the following data:

12	14	16	18	26	16	20	16	11	12	16	15	20	24
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### STEPS:

1. Open Excel Worksheet.
2. Enter the Column heading as 'Values' in the A1 cell and values from A2 to A15.
3. Place the cursor in A16 cell and write 'Mode ='. Then place the cursor in B16 cell and write the formula =MODE(A2:A15) and press enter.

## INPUT & OUTPUT:

	A	B
1	Values	
2	12	
3	14	
4	16	
5	18	
6	26	
7	16	
8	20	
9	16	
10	11	
11	12	
12	16	
13	15	
14	20	
15	24	
16	Mode =	16

13. The monthly profits in rupees of 100 shops are distributed as follows:

Profit per shop	0-100	100-200	200-300	300-400	400-500	500-600
No of shops	10	18	27	20	16	9

Calculation of mode from the above data.

**STEPS:**

1. Open Excel Worksheet.
2. Enter the Column heading as ‘Profit for Shop’ in the A1 cell and enter the values from A2 to A7.
3. Enter the Column heading as ‘No. of Shops’ in the B1 cell and enter the values from B2 to B7.
4. Place the cursor in A8 cell and Write “L1 =”, then place the cursor in B8 cell and write the value 200.
5. Place the cursor in A9 cell and Write “L2 =”, then place the cursor in B9 cell and write the value 300.
6. Place the cursor in A10 cell and Write “L2 – L1 =”, then place the cursor in B10 cell and write the formula =B9-B8 and press enter.
7. Place the cursor in A11 cell and Write “Δ1 =”, then place the cursor in B11 cell and write the formula =B4-B3 and press enter.
8. Place the cursor in A12 cell and Write “Δ2 =”, then place the cursor in B12 cell and write the formula =B4-B5 and press enter.
9. Place the cursor in A13 cell and Write “Mode =”, then place the cursor in B13 cell and write the formula =B8+(B11/(B11+B12))\*B10 and press enter.

Note: Formula of Mode is  $M_0 = L1 + \left( \frac{\Delta1}{\Delta1 + \Delta2} * (L2 - L1) \right)$

**INPUT & OUTPUT:**

	A	B
1	Profit for Shop	No. of Shops
2	0 to 100	10
3	100 to 200	18
4	200 to 300	27
5	300 to 400	20
6	400 to 500	16
7	500 to 600	9
8	L1 =	200
9	L2 =	300
10	L2 - L1	100
11	Δ1 =	9
12	Δ2 =	7
13	Mode =	256.25

**14. Calculate Geometric mean of the following data:**

6.5	169	11	112.5	14.2	75.5	35.5
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**STEPS:**

1. Open Excel Worksheet
2. Enter the heading 'Calculation of Geometric Mean' in the first row.
3. Enter the Column heading as 'Values' in the A2 cell and values from A3 to A9.
4. Place the cursor in A10 cell and write 'Geometric Mean = '.
5. To calculate Geometric Mean, place the cursor in B10 cell and write the formula as "=Geomean(a3:a9)" and press enter.

**INPUT & OUTPUT:**

	A	B
1	Calculation of Geometric Mean	
2	Values	
3	6.5	
4	169	
5	11	
6	112.5	
7	14.2	
8	75.5	
9	35.5	
10	Geometric Mean =	33.9269

**15. Calculate the Harmonic mean of the following;**

5	10	12	15	22	35	50	72
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**STEPS:**

1. Open Excel Worksheet
2. Enter the heading 'Calculation of Harmonic Mean' in the first row.
3. Enter the Column heading as 'Values' in the A2 cell and values from A3 to A10.
4. Place the cursor in A11 cell and write 'Harmonic Mean = '.
5. To calculate Harmonic Mean, place the cursor in B11 cell and write the formula as "=harmean(a3:a10)" and press enter.

**INPUT & OUTPUT:**

	A	B
1	Calculation of Harmonic Mean	
2	Values	
3	5	
4	10	
5	12	
6	15	
7	22	
8	35	
9	50	
10	72	
11	Harmonic Mean =	14.3391054

**16. Calculate the Harmonic mean from the given data:**

<b>X:</b>	<b>10</b>	<b>20</b>	<b>40</b>	<b>60</b>	<b>120</b>
<b>F:</b>	<b>1</b>	<b>3</b>	<b>6</b>	<b>5</b>	<b>4</b>

**STEPS:**

1. Open Excel Worksheet
2. Enter the heading 'Calculation of Harmonic Mean' in the first row.
3. Enter the Column heading as 'Values (X)' in the A2 cell and enter the values from A3 to A7.
4. Enter the Column heading as 'Frequency (f)' in the B2 cell and enter the values from B3 to B7.
5. Place the cursor in C3 cell and write as 'f/X'.
6. Place the cursor in C4 cell and write the formula =A3/A3.
7. Using Fill handle drag and copy the formula in the remaining cells.
8. Place the cursor in A9 cell and write 'N='.
9. To calculate total frequency, place the cursor in B9 cell.
6. Select **INSERT** menu and then select **FUNCTION** option.
7. Select **MATH&TRIG** from function category and **SUM** from function name.
8. Select **OK**.
9. Enter the range B3:B7 or Select the range.
10. Click on Ok .Then the result is displayed as 19 in cell B9.
10. Place the cursor in A10 cell and write 'Σ(f/X) ='.
11. To calculate total of (f/X) =, place the cursor in B10 cell.
11. Select **INSERT** menu and then select **FUNCTION** option.
12. Select **MATH&TRIG** from function category and **SUM** from function name.
13. Select **OK**.
14. Enter the range C3:C7 or Select the range.
12. Click on Ok .Then the result is displayed as 0.516666667 in cell B10.
13. Place the cursor in A11 cell and write 'Harmonic Mean ='.
14. To Calculate Harmonic Mean, place the cursor in the cell B11 and write the formula =B9/B10 and the result 36.77419355.

Note: Formula of Harmonic Mean =  $\frac{N}{\sum(f/X)}$ .

**INPUT & OUTPUT:**

	<b>A</b>	<b>B</b>	<b>C</b>
<b>1</b>	<b>Calculation of Harmonic Mean</b>		
<b>2</b>	<b>Values (X)</b>	<b>Frequency (f)</b>	<b>f/X</b>
<b>3</b>	<b>10</b>	<b>1</b>	<b>0.1</b>
<b>4</b>	<b>20</b>	<b>3</b>	<b>0.15</b>
<b>5</b>	<b>40</b>	<b>6</b>	<b>0.15</b>
<b>6</b>	<b>60</b>	<b>5</b>	<b>0.083333</b>
<b>7</b>	<b>120</b>	<b>4</b>	<b>0.033333</b>
<b>8</b>			
<b>9</b>	<b>N =</b>	<b>19</b>	
<b>10</b>	<b>Σ(f/X) =</b>	<b>0.516666667</b>	
<b>11</b>	<b>Harmonic Mean =</b>	<b>36.77419355</b>	

**17. Find Range and co-efficient of range for following data:**

3	7	21	24	37	40	45
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**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write as 'Values (X)' and then write the values given from B1 to H1.
3. Place the cursor in A2 cell and write as 'Largest Value ='.
4. Place the cursor in B2 cell and enter the value 45.
5. Place the cursor in A3 cell and write as 'Smallest Value ='.
6. Place the cursor in B3 cell and enter the value 3.
7. Place the cursor in A4 cell and write as 'Range ='.
8. To calculate Range, place the cursor in B4 cell and write the formula = B2-B3 and press enter to view the value '42' in the cell B4.
9. Place the cursor in A5 cell and write as 'Coefficient of Range ='.
10. To calculate Coefficient of Range, place the cursor in B5 cell and write the formula =B4/(B2+B3) and press enter to view the value '0.875' in the cell B5.

Note:

Formula of Range = Largest Value – Smallest Value

Formula of Coefficient of Range =  $\frac{\text{Range}}{\text{Largest Value} + \text{Smallest Value}}$ .

**INPUT & OUTPUT:**

	A	B	C	D	E	F	F	H
1	Values (X)	3	7	21	24	37	40	45
2	Largest Value =	45						
3	Smallest Value =	3						
4	Range =	42						
5	Coefficient of Range =	0.875						

**18. Calculate range and its co-efficient from the following data:**

Marks	10-20	20-30	30-40	40-50	50-60
No. of students	16	20	24	16	8

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write as 'Marks' and then write the given Class Intervals from B1 to F1.
3. Place the cursor in A2 cell and write as 'No. of students' and then write the given values from B2 to F2.
4. Place the cursor in A3 cell and write as 'Largest Value ='.
5. Place the cursor in B3 cell and enter the value 60.
6. Place the cursor in A4 cell and write as 'Smallest Value ='.
7. Place the cursor in B4 cell and enter the value 20.
8. Place the cursor in A5 cell and write as 'Range ='.
9. To Calculate Range, place the cursor in B5 cell and write the formula = B3-B4 and press enter to view the value '40' in the cell B5.
10. Place the cursor in A6 cell and write as 'Coefficient of Range ='.

11. To Calculate Coefficient of Range, place the cursor in B6 cell and write the formula =B4/(B3+B4) and press enter to view the value '0.5' in the cell B6.

**Note:** Formula of Range = Largest Value – Smallest Value

Formula of Coefficient of Range =  $\frac{\text{Range}}{\text{Largest Value} + \text{Smallest Value}}$ .

**INPUT & OUTPUT:**

	A	B	C	D	E	F
1	Marks	20 - 30	20-30	30-40	40-50	50-60
2	No. of students	16	20	24	16	8
3	Largest Value =	60				
4	Smallest Value =	20				
5	Range =	40				
6	Coefficient of Range =	0.5				

19. Find out the Value of the quartile deviation and its co-efficient from the following data:

24	7	11	9	17	3	20	14	4	22	27
----	---	----	---	----	---	----	----	---	----	----

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write as 'Values' and then enter the given values from A2 to A12.
3. Place the cursor in B1 cell and write as 'Values in Ascending Order' and then enter the same values from B2 to B12.
4. To Calculate Quartiles Values should be arranged in ascending order. To arrange the values in ascending order, select the data range from B2 to B12 cells and click on the DATA option from menu bar, then click on SORT option. Then click on the ASCENDING ORDER radio button and click OK to view the given values in ascending order from B2 to B12 cells.
5. Place the cursor in A14 cell and write as 'N='.
6. To calculate number of values given, place the cursor in B14 cell.
7. Select INSERT menu and then select FUNCTION option.
8. Select STATISTICS from function category and then COUNT from function name.
9. Select OK.
10. Enter the range B2:B12 or Select the range.
11. Click on Ok .Then the result is displayed as 11 in cell B14.
12. Place the cursor in A15 cell and write as 'Quartile-1 (Q1) = Size of [(N+1)/4]<sup>th</sup> item ='.
13. To calculate Quartile-1 (Q1), place the cursor in B15 cell and write the formula =(B14+1)/4 and press enter view the result as 3.
14. Place the cursor in C15 cell and enter the value as '7'.
15. Place the cursor in A16 cell and write as 'Quartile-3 (Q3) = Size of 3\*[(N+1)/4]<sup>th</sup> item ='.
16. To calculate Quartile-3 (Q3), place the cursor in B16 cell and write the formula =3\*B15 and press enter view the result as 9.
17. Place the cursor in C16 cell and enter the value as '22'.
18. Place the cursor in A17 cell and write as 'Quartile Deviation = (Q3 - Q1)/2 ='.
19. To calculate Quartile Deviation, place the cursor in B17 cell and write the formula =(C16-C15)/2 and press enter view the result as 7.5.
20. Place the cursor in A18 cell and write as 'Coefficient of Quartile Deviation = (Q3-Q1)/(Q3+Q1)='.

21. To calculate Coefficient of Quartile Deviation, place the cursor in B18 cell and write the formula  $= (C16 - C15) / (C16 + C15)$  and press enter view the result as 0.5

**INPUT & OUTPUT:**

	A	B	C
1	Values	Values in Ascending Order	
2	24	3	
3	7	4	
4	11	7	
5	9	9	
6	17	11	
7	3	14	
8	20	17	
9	14	20	
10	4	22	
11	22	24	
12	27	27	
13			
14	N =	11	
15	Quartile-1 (Q1) = Size of $[(N+1)/4]^{\text{th}}$ item =	3	7
16	Quartile-3 (Q3) = Size of $3*[(N+1)/4]^{\text{th}}$ item =	9	22
17	Quartile Deviation = $(Q3 - Q1)/2 =$	7.5	
18	Coefficient of Quartile Deviation = $(Q3 - Q1)/(Q3 + Q1) =$	0.5	

20. Compute the value of quartile deviation and its co-efficient from the following:

X:	4	8	12	16	20	24	28	32
F:	4	9	17	40	53	37	24	16

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write as 'Values (x)' and then enter the given values from A2 to A9.
3. Place the cursor in B1 cell and write as 'Frequency (f)' and then enter the same values from B2 to B9.
4. Place the cursor in C1 cell and write as 'C.F'.
5. Place the cursor in C2 cell and write the formula  $=0+B2$  and press enter to view the value 4.
6. Place the cursor in C3 cell and write the formula  $=C2+B3$  and press enter to view the value 9.
7. Using Fill handle drag and copy the above formula in the remaining cells.
8. Place the cursor in A10 cell and write as 'N='.
9. To calculate total frequency, place the cursor in B10 cell.
10. Select **INSERT** menu and then select **FUNCTION** option.
11. Select **MATH&TRIG** from function category and then **SUM** from function name.
12. Select **OK**.
13. Enter the range B2:B9 or Select the range.
14. Click on Ok .Then the result is displayed as 200 in cell B10.
15. Place the cursor in A11 cell and write as 'Quartile-1 (Q1) = Size of  $[(N+1)/4]^{\text{th}}$  item ='.
16. To calculate Quartile-1 (Q1), place the cursor in B11 cell and write the formula  $=(B10+1)/4$  and press enter view the result as 50.25.



17. Place the cursor in C11 cell and enter the value as '16'.
18. Place the cursor in A12 cell and write as 'Quartile-3 (Q3) = Size of  $3 \times [(N+1)/4]^{\text{th}}$  item = '.
19. To calculate Quartile-3 (Q3), place the cursor in B12 cell and write the formula =3\*B11 and press enter view the result as 150.75.
20. Place the cursor in C13 cell and enter the value as '24'.
21. Place the cursor in A14 cell and write as 'Quartile Deviation =  $(Q3 - Q1)/2$  = '.
22. To calculate Quartile Deviation, place the cursor in B14 cell and write the formula =(C12-C11)/2 and press enter view the result as 4.
23. Place the cursor in A14 cell and write as 'Coefficient of Quartile Deviation =  $(Q3-Q1)/(Q3+Q1)$ ='.
24. To calculate Coefficient of Quartile Deviation, place the cursor in B14 cell and write the formula =(C12-C11)/ (C12+C11) and press enter view the result as 0.2

### INPUT & OUTPUT:

	A	B	C
1	Values (X)	Frequency (f)	CF
2	4	4	4
3	8	9	13
4	12	17	30
5	16	40	70
6	20	53	123
7	24	37	160
8	28	24	184
9	32	16	200
10	N =	200	
11	Quartile-1 (Q1) = Size of $[(N+1)/4]^{\text{th}}$ item =	50.25	16
12	Quartile-3 (Q3) = Size of $3 \times [(N+1)/4]^{\text{th}}$ item =	150.75	24
13	Quartile Deviation = $(Q3 - Q1)/2$ =	4	
14	Coefficient of Quartile Deviation = $(Q3-Q1)/(Q3+Q1)$	0.2	

### 21. From the following data find quartile deviation and its co-efficient:

X:	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
F:	8	10	12	15	10	7	8	5

### STEPS:

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write as 'Class Interval' and then enter the given values from A2 to A9.
3. Place the cursor in B1 cell and write as 'Frequency (f)' and then enter the same values from B2 to B9.
4. Place the cursor in C1 cell and write as 'C.F'.
5. Place the cursor in C2 cell and write the formula =0+B2 and press enter to view the value 8.
6. Place the cursor in C3 cell and write the formula =C2+B3 and press enter to view the value 18.
7. Using Fill handle drag and copy the above formula in the remaining cells.
8. Place the cursor in A10 cell and write as 'N='.
9. To calculate total frequency, place the cursor in B10 cell.
10. Select INSERT menu and then select FUNCTION option.
11. Select MATH&TRIG from function category and then SUM from function name.

12. Select OK.
13. Enter the range B2:B9 or Select the range.
14. Click on Ok .Then the result is displayed as 75 in cell B10.
15. Place the cursor in A11 cell and Write as ‘Calculation of Quartile-1 (Q1)’
16. Place the cursor in A12 cell and Write “(N/4) =”, then place the cursor in B12 cell and write the formula =B10/2 and press enter. Value 18.75 will be displayed in the cell B12.
17. Place the cursor in A13cell and write “L1 =”, then place the cursor in B13 cell and enter 20.
18. Place the cursor in A14 cell and write “L2 =”, then place the cursor in B14 cell and enter 25.
19. Place the cursor in A15 cell and write “L2-L1 =”, then place the cursor in B15 cell and write the formula =B14-B13 and press enter. Value 5 will be displayed in the cell B15.
20. Place the cursor in A16 cell and write “cf =”, then place the cursor in B16 cell and enter 18.
21. Place the cursor in A17 cell and write “(N/4) - cf =”, then place the cursor in B17 cell and write the formula =B12-B16 and press enter. Value 0.75 will be displayed in the cell B17.
22. Place the cursor in A18 cell and write “f =”, then place the cursor in B18 cell and enter 12.
23. Place the cursor in A19 cell and write “Quartile-1 (Q1) =”, then place the cursor in B19 cell and write the formula =B13+(B17\*B15)/B18 and press enter. Value 20.3125 will be displayed in the cell B19.
24. Place the cursor in A20 cell and Write as ‘Calculation of Quartile-3 (Q3)’
25. Place the cursor in A21 cell and Write “[3\*(N/4)] =”, then place the cursor in B21 cell and write the formula =3\*B12 and press enter. Value 56.25 will be displayed in the cell B21.
26. Place the cursor in A22cell and write “L1 =”, then place the cursor in B22 cell and enter 35.
27. Place the cursor in A23 cell and write “L2 =”, then place the cursor in B23 cell and enter 40.
28. Place the cursor in A24 cell and write “L2-L1 =”, then place the cursor in B24 cell and write the formula =B23-B22 and press enter. Value 5 will be displayed in the cell B24.
29. Place the cursor in A25 cell and write “cf =”, then place the cursor in B25 cell and enter 55.
30. Place the cursor in A26 cell and write “[3\*(N/4)] - cf =”, then place the cursor in B26 cell and write the formula =B21-B25 and press enter. Value 1.25 will be displayed in the cell B17.
31. Place the cursor in A27 cell and write “f =”, then place the cursor in B27 cell and enter 7.
32. Place the cursor in A28 cell and write “Quartile-3 (Q3) =”, then place the cursor in B28 cell and write the formula =B22+(B26\*B24)/B27 and press enter. Value 35.89285714 will be displayed in the cell B19.
33. Place the cursor in A29 cell and write as ‘Quartile Deviation = (Q3 - Q1)/2 =’.
34. To calculate Quartile Deviation, place the cursor in B29 cell and write the formula =(B28-B19)/2 and press enter view the result as 7.790178571
35. Place the cursor in A30 cell and write as ‘Coefficient of Quartile Deviation = (Q3-Q1)/(Q3+Q1)=’.
36. To calculate Coefficient of Quartile Deviation, place the cursor in B30 cell and write the formula =( B28-B19)/ (B28+B19) and press enter view the result as 0.27720413

Note:

Formula of Quartile-1 is  $Q1 = L1 + \frac{(N/4-cf)}{f} * (L2-L1)$

Formula of Quartile-3 is  $Q3 = L1 + \frac{(3N/4-cf)}{f} * (L2-L1)$

## INPUT&OUTPUT

	A	B	C
1	Class Interval	Frequency (f)	CF
2	10 to 15	8	8
3	15 to 20	10	18
4	20 to 25	12	30
5	25 to 30	15	45
6	30 to 35	10	55
7	35 to 40	7	62
8	40 to 45	8	70
9	45 to 50	5	75
10	N=	75	
11	Calculation of Quartile-1 (Q1)		
12	N/4 =	18.75	
13	L1 =	20	
14	L2 =	25	
15	L2 - L1 =	5	
16	cf =	18	
17	(N/4) - cf =	0.75	
18	f =	12	
19	Quartile-1 (Q1) =	20.3125	
20	Calculation of Quartile-3 (Q3)		
21	[3*(N/4)] =	56.25	
22	L1 =	35	
23	L2 =	40	
24	L2 - L1 =	5	
25	cf =	55	
26	[3*(N/4)] - cf =	1.25	
27	f =	7	
28	Quartile-3 (Q3) =	35.89285714	
29	Quartile Deviation = (Q3 - Q1)/2 =	7.790178571	
30	Coefficient of Quartile Deviation = (Q3-Q1)/(Q3+Q1) =	0.27720413	

22. Calculate the Mean deviation from i) Mean, ii) Median and iii) Mode in respect of the marks obtained by nine students given below:

Marks	7	4	10	9	15	12	7	9	7
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### STEPS:

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write as 'Marks (X)' and then enter the given values from A2 to A9.
3. Place the cursor in A11 cell and write "Mean =", then place the cursor in B11 cell and then follow INSERT > FUNCTION > STATISCAL > AVERAGE > OK > Select the range from A2 to A10 > OK. Then result 8.888888889 will be displayed in the cell B11.
4. Place the cursor in A12 cell and write "Median =", then place the cursor in B12 cell and then follow INSERT > FUNCTION > STATISCAL > MEDIAN > OK > Select the range from A2 to A10 > OK. Then result 9 will be displayed in the cell B12.
5. Place the cursor in A13 cell and write "Mode =", then place the cursor in B13 cell and then follow INSERT > FUNCTION > STATISCAL > MODE > OK > Select the range from A2 to A10 > OK. Then result 7 will be displayed in the cell B13.

6. Place the cursor in B1 cell and write “X-Mean”, then place the cursor in the cell B2 and write the formula =A2-8.888888889 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
7. Place the cursor in C1 cell and write as ‘|X-Mean|’, then enter the same values of B2 to B10 cells in the C2 to C10 cells ignoring signs.
8. Place the cursor in D1 cell and write “X-Median”, then place the cursor in the cell D2 and write the formula =A2-9 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
9. Place the cursor in E1 cell and write as ‘|X-Median|’, then enter the same values of D2 to D10 cells in the E2 to E10 cells ignoring signs.
10. Place the cursor in F1 cell and write “X-Mode”, then place the cursor in the cell F2 and write the formula =A2-7 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
11. Place the cursor in G1 cell and write as ‘|X-Mode|’, then enter the same values of F2 to F10 cells in the G2 to G10 cells ignoring signs.
12. Place the cursor in A14 cell and write as “ $\sum|X-Mean| =$ ”. Then Place the cursor in B14 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from C2 to C10 > OK. Then result 21.11 will be displayed in the cell B14.
13. Place the cursor in A15 cell and write as “ $\sum|X-Median| =$ ”. Then Place the cursor in B15 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from E2 to E10 > OK. Then result 21 will be displayed in the cell B15.
14. Place the cursor in A16 cell and write as “ $\sum|X-Mode| =$ ”. Then Place the cursor in B16 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from G2 to G10 > OK. Then result 23 will be displayed in the cell B16.
15. Place the cursor in A17 cell and write as “N =”. Then Place the cursor in B17 cell and then follow INSERT > FUNCTION > STATISTICAL > COUNT > OK > Select the range from A2 to A10 > OK. Then result 9 will be displayed in the cell B17.
16. Place the cursor in A18 cell and write as “M.D from Mean =”. Then Place the cursor in B18 cell and write the formula =B14/B17 and press enter to view the result as 2.345555556
17. Place the cursor in A19 cell and write as “M.D from Median =”. Then Place the cursor in B19 cell and write the formula =B15/B17 and press enter to view the result as 2.333333333
18. Place the cursor in A20 cell and write as “M.D from Mode =”. Then Place the cursor in B20 cell and write the formula =B16/B17 and press enter to view the result as 2.555555556
19. Place the cursor in A21 cell and write as “Coefficient of Mean Deviation from Mean =”. Then Place the cursor in B21 cell and write the formula =B18/B11 and press enter.
20. Place the cursor in A22 cell and write as “Coefficient of Mean Deviation from Median =”. Then Place the cursor in B22 cell and write the formula =B19/B12 and press enter.
21. Place the cursor in A23 cell and write as “Coefficient of Mean Deviation from Mode =”. Then Place the cursor in B23 cell and write the formula =B20/B13 and press enter.

**Note:**

$$\text{Mean deviation from Mean} = \frac{\sum|X-Mean|}{N}$$

$$\text{Mean deviation from Median} = \frac{\sum|X-Median|}{N}$$

$$\text{Mean deviation from Mode} = \frac{\sum|X-Mode|}{N}$$

$$\text{Coefficient of Mean deviation from Mean} = \frac{\text{Mean Deviation from Mean}}{\text{Mean}}$$

$$\text{Coefficient of Mean deviation from Median} = \frac{\text{Mean Deviation from Median}}{\text{Median}}$$

Coefficient of Mean deviation from Mode =  $\frac{\text{Mean Deviation from Mode}}{\text{Mode}}$

**INPUT&OUTPUT:**

	A	B	C	D	E	F	G
1	Marks (X)	X-Mean	X-Mean	X-Median	X-Median	X-Mode	X-Mode
2	7	-1.888888889	1.89	-2	2	0	0
3	4	-4.888888889	4.89	-5	5	-3	3
4	10	1.111111111	1.11	1	1	3	3
5	9	0.111111111	0.11	0	0	2	2
6	15	6.111111111	6.11	6	6	8	8
7	12	3.111111111	3.11	3	3	5	5
8	7	-1.888888889	1.89	-2	2	0	0
9	9	0.111111111	0.11	0	0	2	2
10	7	-1.888888889	1.89	-2	2	0	0
11	Mean =	8.888888889					
12	Median =	9					
13	Mode =	7					
14	∑ X-Mean  =	21.11					
15	∑ X-Median  =	21					
16	∑ X-Mode  =	23					
17	N =	9					
18	Mean Deviation from Mean =	2.345555556					
19	Mean Deviation from Median =	2.333333333					
20	Mean Deviation from Mode =	2.555555556					
21	Coefficient of Mean Deviation from Mean =	0.263875					
22	Coefficient of Mean Deviation from Median =	0.259259259					
23	Coefficient of Mean Deviation from Mode =	0.365079365					

23. Calculate the mean deviation from mean from the following data. Also find its co-efficient.

X:	5	10	15	20	25	30
F:	3	4	8	12	7	2

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write as 'Marks (X)' and then enter the given values from A2 to A7.
3. Place the cursor in B1 cell and write as 'Frequency (f)' and then enter the given values from B2 to B7.
4. Place the cursor in C1 cell and write as 'fX' and then place the cursor in the cell C2 and write the formula =A2\*B2 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
5. Place the cursor in A8 cell and write as "N =". Then Place the cursor in B8 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from B2 to B7 > OK.

6. Place the cursor in A9 cell and write as “ $\sum fX =$ ”. Then Place the cursor in B9 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from C2 to C7 > OK.
7. Place the cursor in A10 cell and write as “Mean =”. Then place the cursor in B10 cell and write the formula = B9/B10.
8. Place the cursor in D1 cell and write the column heading as ‘X-Mean’. Then place the cursor in D2 cell and write the formula =A2-18.06 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
9. Place the cursor in E1 cell and write the column heading as ‘|X-Mean|’, then enter the same values of D2 to D7 cells in the E2 to E7 cells ignoring signs.
10. Place the cursor in F1 cell and write the column heading as ‘f \* |X-Mean|’, then place the cursor in F2 cell and write the formula =B2\*E2 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
11. Place the cursor in A11 cell and write as “ $\sum f * |X-Mean| =$ ”. Then Place the cursor in B11 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from F2 to F7 > OK.
12. Place the cursor in A12 cell and write as “Mean Deviation from Mean =”. Then Place the cursor in B12 cell and write the formula =B11/B8 and press enter.
13. Place the cursor in A13 cell and write as “Coefficient of Mean Deviation from Mean =”. Then Place the cursor in B13 cell and write the formula =B12/B10 and press enter.

**Note:**

$$\text{Mean deviation from Mean} = \frac{\sum f * |X - \text{Mean}|}{N}$$

$$\text{Coefficient of Mean deviation from Mean} = \frac{\text{Mean Deviation from Mean}}{\text{Mean}}$$

**INPUT&OUTPUT:**

	A	B	C	D	E	F
1	Marks (X)	Frequency (f)	fX	X-Mean	X-Mean	f *  X-Mean
2	5	3	15	-13.06	13.06	39.18
3	10	4	40	-8.06	8.06	32.24
4	15	8	120	-3.06	3.06	24.48
5	20	12	240	1.94	1.94	23.28
6	25	7	175	6.94	6.94	48.58
7	30	2	60	11.94	11.94	23.88
8	N =	36				
9	$\sum fX =$	650				
10	Mean =	18.05555556				
11	$\sum f *  X - \text{Mean}  =$	191.64				
12	Mean Deviation from Mean =	5.323333333				
13	Coefficient of Mean Deviation from Mean =	0.294830769				

**24. Calculate the standard deviation from the following**

25	27	31	32	35
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**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Values (X)' and then enter the given values from A2 to A6.
3. Place the cursor in A7 cell and write as 'Standard Deviation ='. Then place the cursor in B7 cell and write the formula as "=stdev(a2:a6)" and press enter.

**INPUT&OUTPUT:**

	A	B
1	Values (X)	
2	25	
3	27	
4	31	
5	32	
6	35	
7	Standard Deviation =	4

**25. Compute standard deviation from the following data of income of 10 employees of a firm:**

Income (Rs.):	100	125	130	140	165	170	180	160	145	185
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**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Values (X)' and then enter the given values from A2 to A11.
3. Place the cursor in A12 cell and write as 'Standard Deviation ='. Then place the cursor in B12 cell and write the formula as "=stdev(a2:a11)" and press enter.

**INPUT&OUTPUT:**

	A	B
1	Income (X)	
2	100	
3	125	
4	130	
5	140	
6	165	
7	170	
8	180	
9	160	
10	145	
11	185	
12	Standard Deviation =	26.87419

**26. Compute standard deviation with the help of assumed mean.**

<b>Marks</b>	<b>10</b>	<b>20</b>	<b>30</b>	<b>40</b>	<b>50</b>	<b>60</b>
<b>No. of students</b>	<b>8</b>	<b>12</b>	<b>20</b>	<b>10</b>	<b>7</b>	<b>3</b>

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Marks (X)' and then enter the given values from A2 to A7.
3. Place the cursor in B1 cell and write the column heading as 'No. of Students (f)' and then enter the given values from B2 to B7.
4. Place the cursor in A8 cell and write the heading as 'Assumed Mean (A) ='. Then place the cursor in the cell B8 and enter the value as 10.
5. Place the cursor in C1 cell and write the column heading 'd=X-A'. Then place the cursor in the cell C2 and write the formula =A2-10 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
6. Place the cursor in D1 cell and write the column heading 'd<sup>2</sup>'. Then place the cursor in the cell D2 and write the formula =C2\*C2 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
7. Place the cursor in E1 cell and write the column heading 'fd'. Then place the cursor in the cell E2 and write the formula =B2\*C2 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
8. Place the cursor in F1 cell and write the column heading 'fd<sup>2</sup>'. Then place the cursor in the cell F2 and write the formula =B2\*D2 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
9. Place the cursor in A9 cell and write as "N =". Then Place the cursor in B9 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from B2 to B7 > OK.
10. Place the cursor in A10 cell and write as " $\sum fd$  =". Then Place the cursor in B10 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from E2 to E7 > OK.
11. Place the cursor in A11 cell and write as " $\sum fd^2$  =". Then Place the cursor in B11 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from F2 to F7 > OK.
12. Place the cursor in A12 cell and write as " $(\sum fd^2)/N$  =". Then Place the cursor in B12 cell and write the formula =B11/B9 and press enter.
13. Place the cursor in A13 cell and write as " $(\sum fd)/N$  =". Then Place the cursor in B13 cell and write the formula =B10/B9 and press enter.
14. Place the cursor in A14 cell and write as " $[(\sum fd)/N]^2$  =". Then Place the cursor in B14 cell and write the formula =B13\*B13 and press enter.
15. Place the cursor in A15 cell and write as " $[(\sum fd^2)/N] - [(\sum fd)/N]^2$ ". Then Place the cursor in B15 cell and write the formula =B12-B14 and press enter.
16. Place the cursor in A16 cell and write as "STANDARD DEVIATION". Then Place the cursor in B16 cell and INSERT > FUNCTION > MATH&TRIG > SQRT > OK > Select the cell B15 > OK.



## INPUT&OUTPUT:

	A	B	C	D	E	F
1	Marks (X)	No. Of Students (f)	d = X-A	d <sup>2</sup>	fd	fd <sup>2</sup>
2	10	8	0	0	0	0
3	20	12	10	100	120	1200
4	30	20	20	400	400	8000
5	40	10	30	900	300	9000
6	50	7	40	1600	280	11200
7	60	3	50	2500	150	7500
8	Assumed Mean (A) =	10				
9	N =	60				
10	$\sum fd =$	1250				
11	$(\sum fd^2) =$	36900				
12	$(\sum fd^2)/N =$	615				
13	$[(\sum fd)/N]$	20.83333333				
14	$[(\sum fd)/N]^2 =$	434.0277778				
15	$[(\sum fd^2)/N] - [(\sum fd)/N]^2 =$	180.9722222				
16	STANDARD DEVIATION =	13.45259165				

27. From the following data find out the Karl Pearson's Co-efficient of Skewness:

X:	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5
F:	35	40	48	100	125	87	43	22

### STEPS:

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Values (X)' and then enter the given values from A2 to A9.
3. Place the cursor in B1 cell and write the column heading as 'Frequency (f)' and then enter the given values from B2 to B9.
4. Place the cursor in A10 cell and write the heading as 'Assumed Mean (A) ='. Then place the cursor in the cell B10 and enter the value as 4.5.
5. Place the cursor in C1 cell and write the column heading 'd=X-A'. Then place the cursor in the cell C2 and write the formula =A2-4.5 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
6. Place the cursor in D1 cell and write the column heading 'd<sup>2</sup>'. Then place the cursor in the cell D2 and write the formula =C2\*C2 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
7. Place the cursor in E1 cell and write the column heading 'fd'. Then place the cursor in the cell E2 and write the formula =B2\*C2 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
8. Place the cursor in F1 cell and write the column heading 'fd<sup>2</sup>'. Then place the cursor in the cell F2 and write the formula =B2\*D2 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
9. Place the cursor in A11 cell and write as "N =". Then Place the cursor in B11 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from B2 to B9 > OK.
10. Place the cursor in A12 cell and write as " $\sum fd =$ ". Then Place the cursor in B12 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from E2 to E9 > OK.

11. Place the cursor in A13 cell and write as " $\sum fd^2 =$ ". Then Place the cursor in B13 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from F2 to F9 > OK.
12. Place the cursor in A14 cell and write as " $(\sum fd^2)/N =$ ". Then Place the cursor in B14 cell and write the formula =B13/B11 and press enter.
13. Place the cursor in A15 cell and write as " $(\sum fd)/N =$ ". Then Place the cursor in B15 cell and write the formula =B12/B11 and press enter.
14. Place the cursor in A16 cell and write as " $[(\sum fd)/N]^2 =$ ". Then Place the cursor in B16 cell and write the formula =B15\*B15 and press enter.
15. Place the cursor in A17 cell and write as " $[(\sum fd^2)/N] - [(\sum fd)/N]^2$ ". Then Place the cursor in B17 cell and write the formula =B14-B16 and press enter.
16. Place the cursor in A18 cell and write as "STANDARD DEVIATION". Then Place the cursor in B16 cell and INSERT > FUNCTION > MATH&TRIG > SQRT > OK > Select the cell B17 > OK.
17. Place the cursor in A19 cell and write as "MEAN =". Then Place the cursor in B19 cell and write the formula =B10+(B12/B11) and press enter.
18. Place the cursor in A20 cell and write as "MODE =". Then Place the cursor in B20 cell and enter the value 8.5
19. Place the cursor in A21 cell and write as "STANDARD DEVIATION". Then Place the cursor in B21 cell and write the formula =(B19-B20)/B18 and press enter.

**INPUT&OUTPUT:**

	A	B	C	D	E	F
1	Values (X)	Frequency (f)	d = X-A	d <sup>2</sup>	fd	fd <sup>2</sup>
2	4.5	35	0	0	0	0
3	5.5	40	1	1	40	40
4	6.5	48	2	4	96	192
5	7.5	100	3	9	300	900
6	8.5	125	4	16	500	2000
7	9.5	87	5	25	435	2175
8	10.5	43	6	36	258	1548
9	11.5	22	7	49	154	1078
10	Assumed Mean 'A' =	4.5				
11	N =	500				
12	$\sum fd =$	1783				
13	$(\sum fd^2) =$	7933				
14	$(\sum fd^2)/N =$	15.866				
15	$[(\sum fd)/N] =$	3.566				
16	$[(\sum fd)/N]^2 =$	12.716356				
17	$[(\sum fd^2)/N] - [(\sum fd)/N]^2 =$	3.149644				
18	STANDARD DEVIATION =	1.77472364				
19	MEAN =	8.066				
20	MODE =	8.5				
21	Karl Pearson's Coefficient of Skewness =	-0.244545117				

**28. Find Bowley's Co-Efficient of Skewness for the following data:**

<b>No.of Children per family</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>No. of families</b>	<b>7</b>	<b>10</b>	<b>16</b>	<b>25</b>	<b>18</b>	<b>11</b>	<b>8</b>

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write as 'Values (x)' and then enter the given values from A2 to A8.
3. Place the cursor in B1 cell and write as 'Frequency (f)' and then enter the same values from B2 to B8.
4. Place the cursor in C1 cell and write as 'C.F'. Then place the cursor in C2 cell and write the formula =0+B2 and press enter. Then place the cursor in C3 cell and write the formula =C2+B3 and press enter. Then using Fill handle drag and copy the above formula in the remaining cells.
5. Place the cursor in A9 cell and write as 'N='. Then Place the cursor in B9 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from B2 to B8 > OK.
6. Place the cursor in A10 cell and write as 'Quartile-1 (Q1) = Size of [(N+1)/4]<sup>th</sup> item ='. Then place the cursor in B10 cell and write the formula =(B9+1)/4 and press enter. Then place the cursor in C10 cell and enter the value 2.
7. Place the cursor in A11 cell and write as 'Quartile-3 (Q3) = Size of 3\*[(N+1)/4]<sup>th</sup> item ='. Then place the cursor in B11 cell and write the formula =3\*B10 and press enter. Then place the cursor in C11 cell and enter the value 4.
8. Place the cursor in A12 cell and write as 'MEDIAN (M) = Size of [(N/2)]<sup>th</sup> item ='. Then place the cursor in B12 cell and write the formula =B9/2 and press enter. Then place the cursor in C12 cell and enter the value 3.
9. Place the cursor in A13 cell and write as 'Bowley's Coefficient of Skewness ='. Then place the cursor in B13 cell and write the formula =((C11+C10)-2\*C12)/(C11-C10) and press enter.

**NOTE:**

$$\text{Bowley's Coefficient of Skewness} = \frac{(Q3+Q1)-2M}{(Q3-Q1)}$$

**INPUT & OUTPUT**

	<b>A</b>	<b>B</b>	<b>C</b>
1	<b>Values (X)</b>	<b>Frequency (f)</b>	<b>CF</b>
2	0	7	7
3	1	10	17
4	2	16	33
5	3	25	58
6	4	18	76
7	5	11	87
8	6	8	95
9	<b>N =</b>	95	
10	<b>Quartile-1 (Q1) = Size of [(N+1)/4]<sup>th</sup> item =</b>	24	2
11	<b>Quartile-3 (Q3) = Size of 3*[(N+1)/4]<sup>th</sup> item =</b>	72	4
12	<b>Median (M) = Size of [(N/2)]<sup>th</sup> item =</b>	47.5	3
13	<b>Bowley's Coefficient of skew ness =</b>	0	

29. Calculate the co-efficient of correlation from the following data:

X:	57	58	59	59	60	61	62	64
Y:	67	68	65	68	72	72	69	71

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as ‘Values (X)’ and then enter the given values from A2 to A9.
3. Place the cursor in B1 cell and write the column heading as ‘Values (Y)’ and then enter the given values from B2 to B9.
4. Place the cursor in A10 cell and write as ‘Coefficient of Correlation =’. Then place the cursor in B10 cell and write the formula as “=CORREL(A2:A9,B2:B9)” and press enter.

**INPUT & OUTPUT**

	A	B
1	Values (X)	Values (Y)
2	57	67
3	58	68
4	59	65
5	59	68
6	60	72
7	61	72
8	62	69
9	64	71
10	Coefficient of Correlation =	0.603022689

30. Find out Average and variance from the following data:

Marks	45	55	35	65	40	30	65	34	45	70
-------	----	----	----	----	----	----	----	----	----	----

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as ‘Marks (X)’ and then enter the given values from A2 to A11.
3. Place the cursor in A12 cell and write as ‘Average =’. Then place the cursor in B12 cell and write the formula as “=average(A2:A11)” and press enter.
4. Place the cursor in A13 cell and write as ‘Variance =’. Then place the cursor in B13 cell and write the formula as “=var(A2:A11)” and press enter.

**INPUT&OUTPUT:**

	A	B
1	Marks (X)	
2	45	
3	55	
4	35	
5	65	
6	40	
7	30	
8	65	
9	34	
10	45	
11	70	
12	Average =	48.4
13	Variance =	208.9333333

**31. Calculate correlation from the following data.**

Attendance	30	40	50	60	70	80
Marks	40	50	70	80	90	93

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Values (X)' and then enter the given values from A2 to A7.
3. Place the cursor in B1 cell and write the column heading as 'Values (Y)' and then enter the given values from B2 to B7.
4. Place the cursor in A8 cell and write the heading as 'Coefficient of Correlation ='. Then place the cursor in B8 cell and write the formula as " =CORREL(A2:A7,B2:B7)" and press enter.

**INPUT & OUTPUT**

Attendance (X)	Marks (Y)
30	40
40	50
50	70
60	80
70	90
80	93
Coefficient of Correlation =	0.978596

**32. If R= 0.6 and N = 64. Find out the probable error of the co-efficient of correlation.**

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write as 'R=' and then place the cursor in the cell B1 and enter the given value 0.6
3. Place the cursor in A2 cell and write as 'N=' and then place the cursor in the cell B2 and enter the given value 64.
4. Place the cursor in A3 cell and write as 'R<sup>2</sup>=' and then place the cursor in the cell B3 and write the formula =B1\*B1 and press enter.
5. Place the cursor in A4 cell and write as '√N =' and then place the cursor in the cell B4 and follow INSERT > FUNCTION > MATH&TRIG > SQRT > OK > Select the cell B2 > OK.
6. Place the cursor in A5 cell and write as 'Probable Error =' and then place the cursor in the cell B5 and then write the formula =(0.6745 \* (1-B3))/B4 and press enter.

**NOTE:**

$$\text{Probable Error} = 0.6745 * \frac{(1-r^2)}{\sqrt{N}}$$

**INPUT & OUTPUT**

	A	B
1	R =	0.6
2	N =	64
3	R <sup>2</sup> =	0.36
4	√N =	8
5	Probable Error =	0.05396

**33. If R= 0.8 and N = 7. Find out the probable error of the co-efficient of correlation.**

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write as ‘R=’ and then place the cursor in the cell B1 and enter the given value 0.8
3. Place the cursor in A2 cell and write as ‘N=’ and then place the cursor in the cell B2 and enter the given value 7.
4. Place the cursor in A3 cell and write as ‘R<sup>2</sup>=’ and then place the cursor in the cell B3 and write the formula =B1\*B1 and press enter.
5. Place the cursor in A4 cell and write as ‘√N =’ and then place the cursor in the cell B4 and follow INSERT > FUNCTION > MATH&TRIG > SQRT > OK > Select the cell B2 > OK.
6. Place the cursor in A5 cell and write as ‘Probable Error =’ and then place the cursor in the cell B5 and then write the formula =(0.6745 \* (1-B3))/B4 and press enter.

**NOTE:**

$$\text{Probable Error} = 0.6745 * \frac{(1-r^2)}{\sqrt{N}}$$

**INPUT & OUTPUT**

	A	B
1	R =	0.8
2	N =	7
3	R <sup>2</sup> =	0.64
4	√N =	2.645751
5	Probable Error =	0.091777

**34. Two Judges X and Y assign the following ranks to give entries in a beauty contest. Calculate rank correlation co-efficient.**

	A	B	C	D	E
X:	1	2	3	5	4
Y:	2	1	4	3	5

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as ‘R1’ and then enter the given values from A2 to A6.
3. Place the cursor in B1 cell and write the column heading as ‘R2’ and then enter the given values from B2 to B6.
4. Place the cursor in C1 cell and write the column heading as ‘(R1-R2)’ and then place the cursor in the C2 and write the formula =A2-B2 and press enter. Then by using fill handle drag and copy the formula in the remaining cells.
5. Place the cursor in D1 cell and write the column heading as ‘(R1-R2)<sup>2</sup>’ and then place the cursor in the D2 and write the formula =C2\*C2 and press enter. Then by using fill handle drag and copy the formula in the remaining cells.
6. Place the cursor in A7 cell and write as ‘N=’. Then Place the cursor in B7 cell and then follow INSERT > FUNCTION > STATISTICAL > COUNT > OK > Select the range from B2 to B6 > OK.

7. Place the cursor in A8 cell and write as " $\sum(R1-R2)^2 =$ ". Then Place the cursor in B8 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from D2 to D6 > OK.
8. Place the cursor in A9 cell and write as " $N^3 =$ ". Then Place the cursor in B9 cell and then write the formula =B7\*B7\*B7 and press enter.
9. Place the cursor in A10 cell and write as " $N^3 - N =$ ". Then Place the cursor in B10 cell and then write the formula =B9-B7 and press enter.
10. Place the cursor in A11 cell and write as "Spearman's Rank Correlation =". Then Place the cursor in B11 cell and then write the formula =1-(6\*B8)/B10 and press enter.

**Note:** Formula of Spearman's Rank Correlation  $r_s = 1 - \frac{6 \cdot \sum(R1-R2)^2}{N^3 - N}$

### INPUT & OUTPUT

	A	B	C	D
1	R1	R2	(R1-R2)	(R1-R2) <sup>2</sup>
2	1	2	-1	1
3	2	1	1	1
4	3	4	-1	1
5	5	3	2	4
6	4	5	-1	1
7	N =	5		
8	$\sum(R1-R2)^2 =$	8		
9	$N^3 =$	125		
10	$N^3 - N =$	120		
11	Spearman's Rank Correlation =	0.6		

### 35. Calculate rank correlation co-efficient from the following data:

X:	48	58	72	62	56	45	39	52	25
Y:	63	78	65	70	38	54	60	32	28

### STEPS:

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'X:' and then enter the given values from A2 to A10.
3. Place the cursor in B1 cell and write the column heading as 'Y:' and then enter the given values from B2 to B10.
4. Place the cursor in C1 cell and write the column heading as 'R1' and give the ranks manually for X values from C2 to C10.
5. Place the cursor in D1 cell and write the column heading as 'R2' and give the ranks manually for Y values from D2 to D10.
6. Place the cursor in E1 cell and write the column heading as '(R1-R2)' and then place the cursor in the E2 and write the formula =C2-D2 and press enter. Then by using fill handle drag and copy the formula in the remaining cells.
7. Place the cursor in F1 cell and write the column heading as '(R1-R2)<sup>2</sup>' and then place the cursor in the F2 and write the formula =E2\*E2 and press enter. Then by using fill handle drag and copy the formula in the remaining cells.
8. Place the cursor in A11 cell and write as 'N='. Then Place the cursor in B11 cell and then follow INSERT > FUNCTION > STATISTICAL > COUNT > OK > Select the range from B2 to B10 > OK.

9. Place the cursor in A12 cell and write as “ $\sum(R1-R2)^2 =$ ”. Then Place the cursor in B12 cell and then follow INSERT > FUNCTION > MATH&TRIG > SUM > OK > Select the range from D2 to D10 > OK.
10. Place the cursor in A13 cell and write as “ $N^3 =$ ”. Then Place the cursor in B13 cell and then write the formula =B11\*B11\*B11 and press enter.
11. Place the cursor in A14 cell and write as “ $N^3 - N =$ ”. Then Place the cursor in B14 cell and then write the formula =B13-B11 and press enter.
12. Place the cursor in A15 cell and write as “Spearman’s Rank Correlation =”. Then Place the cursor in B15 cell and then write the formula =1-(6\*B12)/B14 and press enter.

**Note:** Formula of Spearman’s Rank Correlation  $r_s = 1 - \frac{6 \cdot \sum(R1-R2)^2}{N^3 - N}$

### INPUT & OUTPUT

	A	B	C	D	E	F
1	X:	Y:	R1	R2	(R1-R2)	(R1-R2) <sup>2</sup>
2	48	63	6	4	2	4
3	58	78	3	1	2	4
4	72	65	1	3	-2	4
5	62	70	2	2	0	0
6	56	38	4	7	-3	9
7	45	54	7	6	1	1
8	39	60	8	5	3	9
9	52	32	5	8	-3	9
10	25	28	9	9	0	0
11	N =	9				
12	$\sum(R1-R2)^2 =$	40				
13	$N^3 =$	729				
14	$N^3 - N =$	720				
15	Spearman's Rank Correlation =	0.666667				

**36. From the following data obtain the two regression equations and calculate the correlation coefficient:**

X:	1	2	3	4	5	6	7	8	9
Y:	9	8	10	12	11	13	14	16	15

### STEPS:

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as ‘X:’ and then enter the given values from A2 to A10.
3. Place the cursor in B1 cell and write the column heading as ‘Y:’ and then enter the given values from B2 to B10.
4. Place the cursor in A11 cell and write as ‘Mean (X)’. Then Place the cursor in B11 cell and then follow INSERT > FUNCTION > STATISTICAL > AVERAGE > OK > Select the range from A2 to A10 > OK.
5. Place the cursor in A12 cell and write as ‘Mean (Y)’. Then Place the cursor in B12 cell and then follow INSERT > FUNCTION > STATISTICAL > AVERAGE > OK > Select the range from B2 to B10 > OK.
6. Place the cursor in A13 cell and write as ‘Standard Deviation (X)’. Then Place the cursor in B13 cell and then follow INSERT > FUNCTION > STATISTICAL > STDEV > OK > Select the range from A2 to A10 > OK.



7. Place the cursor in A14 cell and write as 'Standard Deviation (Y)'. Then Place the cursor in B14 cell and then follow INSERT > FUNCTION > STATISTICAL > STDEV > OK > Select the range from B2 to B10 > OK.
8. Place the cursor in A15 cell and write the heading as 'Coefficient of Correlation ='. Then place the cursor in B15 cell and follow INSERT > FUNCTION > STATISTICAL > CORREL > OK > Select the range from A2 to A10 in Array1 and Select the range from B2 to B10 in Array2 > OK.
9. Place the cursor in A16 cell and write as 'Regression Coefficient of X on Y ='. Then place the cursor in B16 cell and write the formula as =B15\*B13/B14.
10. Place the cursor in A17 cell and write as 'Regression Coefficient of Y on X ='. Then place the cursor in B17 cell and write the formula as =B15\*B14/B13.
11. Place the cursor in A18 cell and write as 'Regression Equation of X on Y =' and then write the data as shown in the output in the cells B18 to B21.
12. Place the cursor in A19 cell and write as 'Regression Equation of Y on X =' and then write the data as shown in the output in the cells B22 to B25.

### INPUT&OUTPUT

	A	B
1	X:	Y:
2	1	9
3	2	8
4	3	10
5	4	12
6	5	11
7	6	13
8	7	14
9	8	16
10	9	15
11	Mean (X) =	5
12	Mean (Y) =	12
13	Standard Deviation (x) =	2.738612788
14	Standard Deviation (Y) =	2.738612788
15	Coefficient of Correlation =	0.95
16	Regression Coefficient of X on Y =	0.95
17	Regression Coefficient of Y on X =	0.95
18	Regression Equation of X on Y =	(X-2.74) = 0.95 (Y-2.74)
19		(X-2.74) = 0.95Y- 2.603
20		X = 0.95Y - 2.603 + 2.74
21		X = 0.95Y + 0.137
22	Regression Equation of Y on X =	Y-2.74 = 0.95 (X-2.74)
23		Y-2.74 = 0.95X- 2.603
24		Y = 0.95X - 2.603 + 2.74
25		Y = 0.95X + 0.137

37. The following figures relate to the profits of a commercial concern for 8 years. Calculate three yearly moving averages.

Years:	1976	1977	1978	1979	1980	1981	1982	1983
Profits (Rs.)	15,420	14,470	15,520	21,020	26,120	31,950	35,370	34,670

### STEPS:

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Years' and then enter the given values from A2 to A9.
3. Place the cursor in B1 cell and write the column heading as 'Profits' and then enter the given values from B2 to B9.
4. Place the cursor in C1 cell and write the column heading as '3 Yrs Moving Total' and then place the cursor in C3 cell and write the formula =B2+B3+B4 and press enter. Then using fill handle drag and copy the formula to the required cells.
5. Place the cursor in D1 cell and write the column heading as '3 Yrs Moving Average' and then place the cursor in D3 cell and write the formula =C3/3 and press enter. Then using fill handle drag and copy the formula to the required cells.

### INPUT&OUTPUT

	A	B	C	D
1	Years	Profits (Rs)	3 Yrs Moving Total	3 Yrs Moving Average
2	1976	15420		
3	1977	14470	45410	15136.66667
4	1978	15520	51010	17003.33333
5	1979	21020	62660	20886.66667
6	1980	26120	79090	26363.33333
7	1981	31950	93440	31146.66667
8	1982	35370	101990	33996.66667
9	1983	34670		

38. The Production of Iron during 1977-1983 is given below. Fit a straight line trend to these figures.

Year:	1977	1978	1979	1980	1981	1982	1983
Products (in lakhs of tons)	48	50	58	52	45	41	49

### STEPS:

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Years' and then enter the given values from A2 to A8.
3. Place the cursor in B1 cell and write the column heading as 'Production (Y)' and then enter the given values from B2 to B8.
4. Place the cursor in A9 cell and write as 'Average Year =' and then place the cursor in the cell B9 and write the formula =AVERAGE(A2:A8) and press enter.
5. Place the cursor in C1 cell and write the column heading as 'X' and then place the cursor in C2 cell and write the formula =A2-1980 and press enter. Then using fill handle drag and copy the formula to the required cells.
6. Place the cursor in D1 cell and write the column heading as 'X<sup>2</sup>' and then place the cursor in D2 cell and write the formula =C2\*C2 and press enter. Then using fill handle drag and copy the formula to the required cells.
7. Place the cursor in E1 cell and write the column heading as 'XY' and then place the cursor in E2 cell and write the formula =B2\*C2 and press enter. Then using fill handle drag and copy the formula to the required cells.

8. Place the cursor in A10 cell and write as 'N =' and then place the cursor in the cell B10 and write the formula =COUNT(A2:A8) and press enter.
9. Place the cursor in A11 cell and write as 'ΣY =' and then place the cursor in the cell B11 and write the formula =SUM(B2:B8) and press enter.
10. Place the cursor in A12 cell and write as 'ΣX<sup>2</sup> =' and then place the cursor in the cell B12 and write the formula =SUM(D2:D8) and press enter.
11. Place the cursor in A13 cell and write as 'ΣXY =' and then place the cursor in the cell B13 and write the formula =SUM(E2:E8) and press enter.
12. Place the cursor in A14 cell and write as 'a =' and then place the cursor in the cell B14 and write the formula =B11/B10 and press enter.
13. Place the cursor in A15 cell and write as 'b =' and then place the cursor in the cell B15 and write the formula =B13/B12 and press enter.
14. Place the cursor in F1 cell and write as 'Trend Values' and then place the cursor in the cell F2 and write the formula =49+(-1\*C2) and press enter. Then using fill handle drag and copy the formula to the required cells.

**NOTE:**

$$a = \frac{\sum Y}{N}$$

$$b = \frac{\sum XY}{\sum X^2}$$

Trend Equation  $Y_c = a + bX$

**INPUT&OUTPUT**

	A	B	C	D	E	F
1	Years	Production (Y)	X	X <sup>2</sup>	XY	Trend Values (Y <sub>c</sub> )
2	1977	48	-3	9	-144	52
3	1978	50	-2	4	-100	51
4	1979	58	-1	1	-58	50
5	1980	52	0	0	0	49
6	1981	45	1	1	45	48
7	1982	41	2	4	82	47
8	1983	49	3	9	147	46
9	Average Year =	1980				
10	N =	7				
11	ΣY =	343				
12	ΣX <sup>2</sup> =	28				
13	ΣXY =	-28				
14	a =	49				
15	b =	-1				

39. Fit a straight line trend by the method of least squares to the following data. Assuming that same rate of change continues. What would be the predicted earnings for the year 1987 ?

Year :	1978	1979	1980	1981	1982	1983	1984	1985
Earnings (in lakh Rs.)	38	40	65	72	79	60	87	95

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Years' and then enter the given values from A2 to A9.
3. Place the cursor in B1 cell and write the column heading as 'Earnings (Y)' and then enter the given values from B2 to B9.
4. Place the cursor in A9 cell and write as 'Average Year =' and then place the cursor in the cell B9 and write the formula =AVERAGE(A2:A9) and press enter.
5. Place the cursor in C1 cell and write the column heading as 'd' and then place the cursor in C2 cell and write the formula =A2-1981.5 and press enter. Then using fill handle drag and copy the formula to the required cells.
6. Place the cursor in D1 cell and write the column heading as 'X' and then place the cursor in D2 cell and write the formula =2\*C2 and press enter. Then using fill handle drag and copy the formula to the required cells.
7. Place the cursor in E1 cell and write the column heading as 'X<sup>2</sup>' and then place the cursor in E2 cell and write the formula =D2\*D2 and press enter. Then using fill handle drag and copy the formula to the required cells.
8. Place the cursor in F1 cell and write the column heading as 'XY' and then place the cursor in F2 cell and write the formula =B2\*D2 and press enter. Then using fill handle drag and copy the formula to the required cells.
9. Place the cursor in A11 cell and write as 'N =' and then place the cursor in the cell B11 and write the formula =COUNT(A2:A9) and press enter.
10. Place the cursor in A12 cell and write as 'ΣY =' and then place the cursor in the cell B12 and write the formula =SUM(B2:B9) and press enter.
11. Place the cursor in A13 cell and write as 'ΣX<sup>2</sup> =' and then place the cursor in the cell B13 and write the formula =SUM(E2:E9) and press enter.
12. Place the cursor in A14 cell and write as 'ΣXY =' and then place the cursor in the cell B14 and write the formula =SUM(F2:F9) and press enter.
13. Place the cursor in A15 cell and write as 'a =' and then place the cursor in the cell B15 and write the formula =B12/B11 and press enter.
14. Place the cursor in A16 cell and write as 'b =' and then place the cursor in the cell B16 and write the formula =B14/B13 and press enter.
15. Place the cursor in G1 cell and write as 'Trend Values' and then place the cursor in the cell G2 and write the formula =67+3.72619\*D2 and press enter. Then using fill handle drag and copy the formula to the required cells.
16. Place the cursor in A17 cell and write as 'Estimated earnings for 1987 =' and then place the cursor in the cell B17 and write the formula as =67+3.72619\*11 and press enter.

**NOTE:**

$$a = \frac{\sum Y}{N}$$

$$b = \frac{\sum XY}{\sum X^2}$$

Trend Equation  $Y_c = a + bX$

## INPUT&OUTPUT

	A	B	C	D	E	F	G
1	Years	Earnings (Y)	d	X	X <sup>2</sup>	XY	Trend Values (Yc)
2	1978	38	-3.5	-7	49	-266	40.91667
3	1979	40	-2.5	-5	25	-200	48.36905
4	1980	65	-1.5	-3	9	-195	55.82143
5	1981	72	-0.5	-1	1	-72	63.27381
6	1982	79	0.5	1	1	79	70.72619
7	1983	60	1.5	3	9	180	78.17857
8	1984	87	2.5	5	25	435	85.63095
9	1985	95	3.5	7	49	665	93.08333
10	Average Year =	1981.5					
11	N =	8					
12	$\sum Y =$	536					
13	$\sum X^2 =$	168					
14	$\sum XY =$	626					
15	a =	67					
16	b =	3.726190476					
17	Estimated Earnings for 1987 =	107.98809					

40. Using Five yearly moving average, determine the trend values from the following data:

Year:	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Production ('000 tons)	42	44	46	50	48	44	50	52	54	52

### STEPS:

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Years' and then enter the given values from A2 to A11.
3. Place the cursor in B1 cell and write the column heading as 'Production' and then enter the given values from B2 to B11.
4. Place the cursor in C1 cell and write the column heading as '5 Yrs Moving Total' and then place the cursor in C3 cell and write the formula =B2+B3+B4+B5+B6 and press enter. Then using fill handle drag and copy the formula to the required cells.
5. Place the cursor in D1 cell and write the column heading as '5 Yrs Moving Average' and then place the cursor in D4 cell and write the formula =C4/5 and press enter. Then using fill handle drag and copy the formula to the required cells.

## INPUT&OUTPUT

	A	B	C	D
1	Year	Production	5 Yrs Moving Total	5 Yrs Moving Average
2	1989	42		
3	1990	44		
4	1991	46	230	46
5	1992	50	232	46.4
6	1993	48	238	47.6
7	1994	44	244	48.8
8	1995	50	248	49.6
9	1996	52	252	50.4
10	1997	54		
11	1998	52		

41. Calculate the seasonal index for the following data by using the average method:

Year	1 <sup>st</sup> quarter	2 <sup>nd</sup> quarter	3 <sup>rd</sup> quarter	4 <sup>th</sup> quarter
1974	72	68	80	70
1975	76	70	82	74
1976	74	66	84	80
1977	76	74	84	78
1978	78	74	86	82

### STEPS:

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Years' and then enter the given years from A2 to A6.
3. Place the cursor in B1 cell and write the column heading as 'Quarter - 1' and then enter the given values from B2 to B6.
4. Place the cursor in C1 cell and write the column heading as 'Quarter - 2' and then enter the given values from C2 to C6.
5. Place the cursor in D1 cell and write the column heading as 'Quarter - 3' and then enter the given values from D2 to D6.
6. Place the cursor in E1 cell and write the column heading as 'Quarter - 4' and then enter the given values from E2 to E6.
7. Place the cursor in A7 cell and write as 'Seasonal Total ='. Then place the cursor in B7 cell and write the formula =SUM(B2:B6) and press enter. Using fill handle drag and copy the formula in the required cells.
8. Place the cursor in A8 cell and write as 'Seasonal Average ='. Then place the cursor in B8 cell and write the formula =B7/5 and press enter. Using fill handle drag and copy the formula in the required cells.
9. Place the cursor in A9 cell and write as 'Yearly Total ='. Then place the cursor in B9 cell and write the formula =SUM(B8:E8) and press enter.
10. Place the cursor in A10 cell and write as 'Yearly Average ='. Then place the cursor in B10 cell and write the formula =B9/4 and press enter.
11. Place the cursor in A11 cell and write as 'Seasonal Index ='. Then place the cursor in B11 cell and write the formula =B8\*100/76.4 and press enter. Using fill handle drag and copy the formula in the required cells.

NOTE: Yearly Total = Sum of Seasonal Averages of 4 Quarters / 4

Yearly Average = Yearly Total / 4

Seasonal Index =  $\frac{\text{Seasonal Average} * 100}{\text{Yearly Average}}$

## INPUT&OUTPUT

	A	B	C	D	E
1	Year	Quarter - 1	Quarter - 2	Quarter - 3	Quarter - 4
2	1974	72	68	80	70
3	1975	76	70	82	74
4	1976	74	66	84	80
5	1977	76	74	84	78
6	1978	78	74	86	82
7	Seasonal Total =	376	352	416	384
8	Seasonal Average =	75.2	70.4	83.2	76.8
9	Yearly Total =	305.6			
10	Yearly Average =	76.4			
11	Seasonal Index =	98.429319	92.146597	108.90052	100.52356

42. From the following data, construct an index for 1991 taking 1990 as base:

Commodities	Price in 1990 Rs.	Price in 1991 Rs.
A	45	50
B	55	60
C	20	40
D	50	60
E	85	90
F	95	110

### STEPS:

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Commodities' and then enter the given Commodities from A2 to A7.
3. Place the cursor in B1 cell and write the column heading as 'Price in 1990 Rs. (P<sub>0</sub>)' and then enter the given values from B2 to B7.
4. Place the cursor in C1 cell and write the column heading as 'Price in 1991 Rs. (P<sub>1</sub>)' and then enter the given values from C2 to C7.
5. Place the cursor in A8 cell and write the as 'ΣP<sub>1</sub> =' and then place the cursor in B8 cell and write the formula =SUM(C2:C7) and press enter.
6. Place the cursor in A9 cell and write the as 'ΣP<sub>0</sub> =' and then place the cursor in B9 cell and write the formula =SUM(B2:B7) and press enter.
7. Place the cursor in A10 cell and write the as 'Price Index (Simple Aggregative method) =' and then place the cursor in B10 cell and write the formula =(B8/B9)\*100 and press enter.

### NOTE:

Simple Aggregative Method – Price Index =  $\frac{\sum P_1}{\sum P_0} * 100$

## INPUT&OUTPUT

	A	B	C
1	Commodities	Price in 1990 Rs.(P <sub>0</sub> )	Price in 1991 Rs.(P <sub>1</sub> )
2	A	45	50
3	B	55	60
4	C	20	40
5	D	50	60
6	E	85	90
7	F	95	110
8	ΣP <sub>1</sub> =	410	
9	ΣP <sub>0</sub> =	350	
10	Price Index (Simple Aggregative method) =	117.1428571	

**43. Calculate index number by Average of relative method, using Arithmetic mean.**

Commodity	A	B	C	D	E
Price in 1990	6	10	2	12	5
Price in 1991	8	15	4	8	5

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as ‘Commodity’ and then enter the given commodities from A2 to A6.
3. Place the cursor in B1 cell and write the column heading as ‘Price in 1990 Rs. (P<sub>0</sub>)’ and then enter the given values from B2 to B6.
4. Place the cursor in C1 cell and write the column heading as ‘Price in 1991 Rs. (P<sub>1</sub>)’ and then enter the given values from C2 to C6.
5. Place the cursor in D1 cell and write the column heading as ‘Price Relatives (P)’ and then place the cursor in the cell D2 and write the formula =(C2/B2)\*100 and press enter. Using fill handle drag and copy the formula to the required cells.
6. Place the cursor in A7 cell and write as ‘N =’ and then place the cursor in the cell B7 and write the formula =COUNT(B2:B6) and press enter.
7. Place the cursor in A8 cell and write as ‘ΣP =’ and then place the cursor in the cell B8 and write the formula =SUM(D2:D6) and press enter.
8. Place the cursor in the 9<sup>th</sup> row and write as ‘Price Index (Simple Average of Price Relatives Using Arithmetic Mean) =’ and then place the cursor in the cell B10 and write the formula =B8/B7 and press enter.

**NOTE:**

$$\text{Price Relatives (P)} = \frac{P_1 * 100}{P_0}$$

$$\text{Price Index using Simple average of price relatives using arithmetic mean} = \frac{\sum P}{N}$$

**INPUT&OUTPUT**

	A	B	C	D	E
1	Commodity	Price In 1990 (P <sub>0</sub> )	Price In 1991 (P <sub>1</sub> )	Price Relatives (P)	
2	A	6	8	133.3333333	
3	B	10	15	150	
4	C	2	4	200	
5	D	12	8	66.66666667	
6	E	5	5	100	
7	N =	5			
8	ΣP =	650			
9	Price Index (Simple Average of Price Relatives Using Arithmetic Mean) =				
10		130			



44. Compute weighted price index from the following data by using:  
 (i) Laspeyre's method (ii) Paasche's method (iii) Dorbish Bowley's method  
 (iv) Marshall – Edge worth method (v) Fisher's Ideal method.

Commodity	Base year 1995		Current year 1998	
	Price	Quantity	Price	Quantity
A	3	10	5	20
B	6	12	8	15
C	5	15	6	20
D	4	20	3	30

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Commodity' and then enter the given commodities from A2 to A5.
3. Place the cursor in B1 cell and write the column heading as 'P<sub>0</sub> =' and then enter the given base year prices from B2 to B5.
4. Place the cursor in C1 cell and write the column heading as 'P<sub>1</sub> =' and then enter the given current year prices from C2 to C5.
5. Place the cursor in D1 cell and write the column heading as 'Q<sub>0</sub> =' and then enter the given base year quantities from D2 to D5.
6. Place the cursor in E1 cell and write the column heading as 'Q<sub>1</sub> =' and then enter the given current year quantities from E2 to E5.
7. Place the cursor in F1 cell and write the column heading as 'P<sub>0</sub>Q<sub>0</sub> =' and then place the cursor in the cell F2 and then write the formula =B2\*D2 and press enter. Using fill handle drag and copy the formula in the required cells.
8. Place the cursor in G1 cell and write the column heading as 'P<sub>1</sub>Q<sub>1</sub> =' and then place the cursor in the cell G2 and then write the formula =C2\*E2 and press enter. Using fill handle drag and copy the formula in the required cells.
9. Place the cursor in H1 cell and write the column heading as 'P<sub>0</sub>Q<sub>1</sub> =' and then place the cursor in the cell H2 and then write the formula =B2\*E2 and press enter. Using fill handle drag and copy the formula in the required cells.
10. Place the cursor in I1 cell and write the column heading as 'P<sub>1</sub>Q<sub>0</sub> =' and then place the cursor in the cell I2 and then write the formula =C2\*D2 and press enter. Using fill handle drag and copy the formula in the required cells.
11. Place the cursor in A6 cell and write the column heading as 'ΣP<sub>0</sub>Q<sub>0</sub> =' and then place the cursor in the cell B6 and then write the formula =SUM(F2:F5) and press enter.
12. Place the cursor in A7 cell and write the column heading as 'ΣP<sub>1</sub>Q<sub>1</sub> =' and then place the cursor in the cell B7 and then write the formula =SUM(G2:G5) and press enter.
13. Place the cursor in A8 cell and write the column heading as 'ΣP<sub>0</sub>Q<sub>1</sub> =' and then place the cursor in the cell B8 and then write the formula =SUM(H2:H5) and press enter.
14. Place the cursor in A9 cell and write the column heading as 'ΣP<sub>1</sub>Q<sub>0</sub> =' and then place the cursor in the cell B9 and then write the formula =SUM(I2:I5) and press enter.
15. Place the cursor in A10 cell and write as 'Laspeyre's Method =' and then place the cursor in the cell B10 and then write the formula =(B9/B6)\*100 and press enter.
16. Place the cursor in A11 cell and write as 'Paasche's Method =' and then place the cursor in the cell B11 and then write the formula =(B7/B8)\*100 and press enter.
17. Place the cursor in A12 cell and write as 'Bowley's Method =' and then place the cursor in the cell B12 and then write the formula =50\*((B9/B6)+(B7/B8)) and press enter.
18. Place the cursor in A13 cell and write as 'Marshall's Method =' and then place the cursor in the cell B13 and then write the formula =((B9+B7)/(B6+B8))\*100 and press enter.

19. Place the cursor in A14 cell and write as 'Fisher's Method =' and then place the cursor in the cell B14 and then write the formula =(SQRT((B9/B6)\*(B7/B8)))\*100 and press enter.

**NOTE:**

$$\text{Laspyere's Method} = \frac{\sum P_1 Q_0 * 100}{\sum P_0 Q_0}$$

$$\text{Paasche's Method} = \frac{\sum P_1 Q_1 * 100}{\sum P_0 Q_1}$$

$$\text{Bowley's Method} = 50 * \left\{ \left( \frac{\sum P_1 Q_0}{\sum P_0 Q_0} \right) + \left( \frac{\sum P_1 Q_1}{\sum P_0 Q_1} \right) \right\}$$

$$\text{Marshall's Method} = \left( \frac{\sum P_1 Q_0 + \sum P_1 Q_1}{\sum P_0 Q_0 + \sum P_0 Q_1} \right) * 100$$

$$\text{Fisher's Method} = \left( \frac{\sum P_1 Q_0 * \sum P_1 Q_1}{\sum P_0 Q_0 * \sum P_0 Q_1} \right) * 100$$

**INPUT&OUTPUT**

	A	B	C	D	E	F	G	H	I
1	Commodity	P <sub>0</sub>	P <sub>1</sub>	Q <sub>0</sub>	Q <sub>1</sub>	P <sub>0</sub> Q <sub>0</sub>	P <sub>1</sub> Q <sub>1</sub>	P <sub>0</sub> Q <sub>1</sub>	P <sub>1</sub> Q <sub>0</sub>
2	A	3	5	10	20	30	100	60	50
3	B	6	8	12	15	72	120	90	96
4	C	5	6	15	20	75	120	100	90
5	D	4	3	20	30	80	90	120	60
6	∑P <sub>0</sub> Q <sub>0</sub> =	257							
7	∑P <sub>1</sub> Q <sub>1</sub> =	430							
8	∑P <sub>0</sub> Q <sub>1</sub> =	370							
9	∑P <sub>1</sub> Q <sub>0</sub> =	296							
10	Laspeyre's Method =	115.1751							
11	Paasche's Method =	116.2162							
12	Bowley's Method =	115.6957							
13	Marshall's Method =	115.7895							
14	Fisher's Method =	115.6945							

45. From the following data price index by weighted average of price relatives method using Arithmetic mean:

Commodity	Price in 1995	Quantity in 1995	Price in 2000
A	35	5	48
B	25	10	40
C	40	6	50

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Commodity' and then enter the given commodities from A2 to A4.

3. Place the cursor in B1 cell and write the column heading as 'P<sub>0</sub> =' and then enter the given base year prices from B2 to B4.
4. Place the cursor in C1 cell and write the column heading as 'P<sub>1</sub> =' and then enter the given current year prices from C2 to C4.
5. Place the cursor in D1 cell and write the column heading as 'Q<sub>0</sub> =' and then enter the given base year quantities from D2 to D4.
6. Place the cursor in E1 cell and write the column heading as 'Price Relatives (P) =' and then place the cursor in the cell E2 = (C2/B2)\*100 and press enter. Then by using fill handle drag and copy the formula to the required cells.
7. Place the cursor in F1 cell and write the column heading as 'Value Index (V) =' and then place the cursor in the cell F2 = B2\*D2 and press enter. Then by using fill handle drag and copy the formula to the required cells.
8. Place the cursor in G1 cell and write the column heading as 'PV =' and then place the cursor in the cell G2 = E2\*F2 and press enter. Then by using fill handle drag and copy the formula to the required cells.
9. Place the cursor in A5 cell and write the column heading as 'ΣPV =' and then place the cursor in the cell B5 = SUM(G2:G4) and press enter.
10. Place the cursor in A6 cell and write the column heading as 'ΣV =' and then place the cursor in the cell B6 = SUM(F2:F4) and press enter.
11. Place the cursor in 7<sup>th</sup> row and write as "Price Index (Weighted Average of price relatives using arithmetic Mean) =" and then place the cursor in E8 cell and write the formula as =B5/B6.

**NOTE:**

$$\text{Price Index (Weighted Average of Price Relatives using Arithmetic Mean)} = \frac{\sum PV}{\sum V}$$

$$\text{Where Price relatives } P = \frac{P_1 * 100}{P_0}$$

$$\text{Where } V = P_0 Q_0$$

**INPUT&OUTPUT**

	A	B	C	D	E	F	G
1	Commodity	P <sub>0</sub>	P <sub>1</sub>	Q <sub>0</sub>	Price Relatives (P)	Value Index (V)	PV
2	A	35	48	5	137.1428571	175	24000
3	B	25	40	10	160	250	40000
4	C	40	50	6	125	240	30000
5	ΣPV =	94000					
6	ΣV =	665					
7	Price Index (Weighted Average of price relatives using arithmetic Mean) =						
8					141.3533835		

**46. Construct index number by chain base method for the following data:**

<b>Years:</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>
<b>Price of wheat per 100 kg</b>	<b>530</b>	<b>600</b>	<b>770</b>	<b>800</b>	<b>840</b>	<b>900</b>

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Years' and then enter the given years from A2 to A7.
3. Place the cursor in B1 cell and write the column heading as 'Price of Wheat per 100 kg =' and then enter the given base year prices from B2 to B7.

- Place the cursor in C1 cell and write the column heading as 'Link Relative' and then place the cursor in the cell C2 and enter the value as 100.
- Then place the cursor in C3 cell and write the formula  $= (B3/B2)*100$  and press enter. Then by using fill handle drag and copy the formula to the required cells.
- Place the cursor in D1 cell and write the column heading as 'Chain Index' and then place the cursor in the cell D2 and enter the value as 100.
- Then place the cursor in D3 cell and write the formula  $= (C3*D2)/100$  and press enter. Then by using fill handle drag and copy the formula to the required cells.

**NOTE:**

$$\text{Link Relative} = \frac{\text{Current year price}}{\text{Previous year price}} * 100$$

$$\text{Chain Base Index} = \frac{\text{Current Year Link Relative} * \text{Previous Year Chain Base Index}}{100}$$

**INPUT&OUTPUT**

	A	B	C	D
1	Years	Price of Wheat per 100 kg	Link Relative	Chain Index
2	1992	530	100	100
3	1993	600	113.2075472	113.2075472
4	1994	770	128.3333333	145.2830189
5	1995	800	103.8961039	150.9433962
6	1996	840	105	158.490566
7	1997	900	107.1428571	169.8113208

**Problem 47:** From the following data of the wholesale price of wheat for the ten years, construct index numbers taking 1979 as base.

Years:	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Price of wheat Rs.20 per kg	50	60	62	65	70	78	82	84	88	90

**STEPS:**

- Open Excel Worksheet.
- Place the cursor in A1 cell and write the column heading as 'Years' and then enter the given years from A2 to A11.
- Place the cursor in B1 cell and write the column heading as 'Price of Wheat per 100 kg =' and then enter the given base year prices from B2 to B11.
- Place the cursor in C1 cell and write as column heading as 'Price Index' and then place the cursor in the cell C2 and write the formula as  $= (b2/50)*100$  and press enter. Then by using fill handle drag and copy the formula to the required cells.

**NOTE:**

$$\text{Index Number for a period} = \frac{\text{Value of current period}}{\text{Value in base period}} * 100$$

Here, 1979 is considered to be as base year.

### INPUT&OUTPUT

	A	B	C
1	Years	Price of Wheat per 20 kg	Price Index
2	1979	50	100
3	1980	60	120
4	1981	62	124
5	1982	65	130
6	1983	70	140
7	1984	78	156
8	1985	82	164
9	1986	84	168
10	1987	88	176
11	1988	90	180

**Problem 48:** The Annual wages (in Rs.) of workers are given along with consumer price indices. Find (i) the real wages and ii) the real wage indices.

Years	1990	1991	1992	1993
Wages	1800	2200	3400	3600
Consumer price indices	10	170	300	320

#### STEPS:

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Years' and then enter the given years from A2 to A5.
3. Place the cursor in B1 cell and write the column heading as 'Wages' and then enter the given values from B2 to B5.
4. Place the cursor in C1 cell and write the column heading as 'Consumer Price Index' and then enter the given prices from C2 to C5.
5. Place the cursor in D1 cell and write as column heading as 'Real Wages' and then place the cursor in the cell D2 and write the formula as  $=(B2/C2)*100$  and press enter. Then by using fill handle drag and copy the formula to the required cells.
6. Place the cursor in E1 cell and write as column heading as 'Real Wage Indices' and then place the cursor in the cell E2 and write the formula as  $=(D2/1800)*100$  and press enter. Then by using fill handle drag and copy the formula to the required cells.

#### NOTE:

$$\text{Real Income} = \frac{\text{Given Income}}{\text{Given Index}} * 100$$

$$\text{Index Number for a period} = \frac{\text{Value of current period}}{\text{Value in base period}} * 100$$

Here, 1990 is considered to be as base year.

## INPUT&OUTPUT

	A	B	C	D	E
1	Years	Wages	Consumer Price Indices	Real Wages	Real wage Indices
2	1990	1800	100	1800	100
3	1991	2200	170	1294.117647	71.89542484
4	1992	3400	300	1133.333333	62.96296296
5	1993	3600	320	1125	62.5

**Problem 49:** Construct the consumer price index number for 1983 on the basis of 1982 from the following data using: (i) The aggregate expenditure method. (ii) The family budget method.

Commodities	Quality consumed in 1982	Units	Price in 1982 (Rs.)	Price in 1983 (Rs.)
A	6 quintal	Quintal	11.50	12.00
B	6 quintal	Quintal	10.00	16.00
C	1 kg	Kg	12.00	18.00
D	6 kg	Kg	16.00	20.00
E	4 kg	Kg	4.00	3.00
F	1 kg	Kg	40.00	30.00

### STEPS:

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Commodities' and then enter the given items from A2 to A7.
3. Place the cursor in B1 cell and write the column heading as 'Q<sub>0</sub>' and then enter the given base year quantities from B2 to B7.
4. Place the cursor in C1 cell and write the column heading as 'Units' and then enter the given measures of unit from C2 to C7.
5. Place the cursor in D1 cell and write the column heading as 'P<sub>0</sub>' and then enter the given base year prices from D2 to D7.
6. Place the cursor in E1 cell and write the column heading as 'P<sub>1</sub>' and then enter the given current year prices from E2 to E7.
7. Place the cursor in F1 cell and write the column heading as 'P' and then place the cursor in F2 cell and write the formula as  $= (E2/D2)*100$  and press enter. Using fill handle drag and copy the formula to the required cells.
8. Place the cursor in G1 cell and write the column heading as ' $V = P_0Q_0$ ' and then place the cursor in G2 cell and write the formula as  $= D2*B2$  and press enter. Using fill handle drag and copy the formula to the required cells.
9. Place the cursor in H1 cell and write the column heading as ' $P_1Q_0$ ' and then place the cursor in H2 cell and write the formula as  $= E2*B2$  and press enter. Using fill handle drag and copy the formula to the required cells.
10. Place the cursor in I1 cell and write the column heading as ' $P_1Q_0$ ' and then place the cursor in I2 cell and write the formula as  $= F2*G2$  and press enter. Using fill handle drag and copy the formula to the required cells.
11. Place the cursor in A8 cell and write as ' $\sum P_0Q_0 =$ ' and then place the cursor in B8 cell and write the formula  $= \text{SUM}(G2:G7)$  and press enter.
12. Place the cursor in A9 cell and write as ' $\sum P_1Q_0 =$ ' and then place the cursor in B9 cell and write the formula  $= \text{SUM}(H2:H7)$  and press enter.
13. Place the cursor in A10 cell and write as ' $\sum PV =$ ' and then place the cursor in B10 cell and write the formula  $= \text{SUM}(I2:I7)$  and press enter.

14. Place the cursor in A11 cell and write as ' $\sum V =$ ' and then place the cursor in B11 cell and write the formula =SUM(G2:G7) and press enter.
15. Place the cursor in 12<sup>th</sup> row and write as 'Consumer Price Index for 1983 with 1982 as base using Aggregate Expenditure Method:' and then place the cursor in B13 cell and write the formula =(B9/B8)\*100 and press enter.
16. Place the cursor in 14<sup>th</sup> row and write as 'Consumer Price Index for 1983 with 1982 as base using Family Budget Method:' and then place the cursor in B15 cell and write the formula =B10/B11 and press enter.

**NOTE:**

$$\text{Consumer price index using aggregate expenditure method} = \frac{\sum P_1 Q_0}{\sum P_0 Q_0} * 100$$

$$\text{Consumer price index using family expenditure method} = \frac{\sum PV}{\sum V} * 100$$

**INPUT&OUTPUT**

	A	B	C	D	E	F	G	H	I
1	Commodities	Q <sub>0</sub>	Units	P <sub>0</sub>	P <sub>1</sub>	P	V = P <sub>0</sub> Q <sub>0</sub>	P <sub>1</sub> Q <sub>0</sub>	PV
2	A	6	Quintal	11.5	12	104.3478261	69	72	7200
3	B	6	Quintal	10	16	160	60	96	9600
4	C	1	Kg	12	18	150	12	18	1800
5	D	6	kg	16	20	125	96	120	12000
6	E	4	kg	4	3	75	16	12	1200
7	F	1	kg	40	30	75	40	30	3000
8	$\sum P_0 Q_0 =$	293							
9	$\sum P_1 Q_0 =$	348							
10	$\sum PV =$	34800							
11	$\sum V =$	293							
12	Consumer Price Index for 1983 with 1982 as base using Aggregate Expenditure Method:								
13		118.7713311							
14	Consumer Price Index for 1983 with 1982 as base using Family Budget Method:								
15		118.7713311							

**Problem 50: Construct the cost of living index number from the table given below:**

	Group	Index for 1982	Expenditure
1.	Food	550	46%
2.	Clothing	220	7%
3.	Lighting	215	10%
4.	House Rent	275	25%
5.	Miscellaneous	150	12%

**STEPS:**

1. Open Excel Worksheet.
2. Place the cursor in A1 cell and write the column heading as 'Group' and then enter the given items from A2 to A6.
3. Place the cursor in B1 cell and write the column heading as 'P' and then enter the given Price Indices from B2 to B6.

4. Place the cursor in C1 cell and write the column heading as 'V' and then enter the given value weights from C2 to C6.
5. Place the cursor in D1 cell and write the column heading as 'PV' and then place the cursor in D2 cell and write the formula =B2\*C2 and press enter. Using fill handle drag and copy the formula to the required cells.
6. Place the cursor in A7 cell and write as ' $\sum PV =$ ' and then place the cursor in B7 cell and write the formula = SUM(D2:D6) and press enter.
7. Place the cursor in A8 cell and write as ' $\sum V =$ ' and then place the cursor in B8 cell and write the formula = SUM(C2:C6) and press enter.
8. Place the cursor in A9 cell and write as 'Cost of Living Index =' and then place the cursor in B9 cell and write the formula = B7/B8 and press enter.

Note:

$$\text{Cost of Living Index} = \frac{\sum PV}{\sum V}$$

### INPUT&OUTPUT

	A	B	C	D
1	Group	P	V	PV
2	Food	550	46	25300
3	Clothing	220	7	1540
4	Lighting	215	10	2150
5	House Rent	275	25	6875
6	Miscellaneous	150	12	1800
7	$\sum PV =$	37665		
8	$\sum V =$	100		
9	Cost of Living Index =	376.65		

## Instructions for doing Business Statistics Project Record

1. Record should be written by the student in his / her own hand writing.
2. Record should be written in the record book issued by the college.
3. Record should be written on both the sides of the paper.
4. Following colour pens should be strictly followed while writing the record.
  - Questions with Black colour pen.
  - Steps with Blue colour pen.
  - Input and output with Pencil. [Note: Colour Pencils can also be used].
5. The record will be accepted by the internal faculty only when the above rules are followed.
6. Date of submission of business statistics record is on before 15<sup>th</sup> December of present academic year.
7. Questions that need to be practiced from Practical Examination point of view 1, 6, 7, 9, 12, 14, 15, 17, 18, 24, 25, 29, 30, 31, 32, 33, 37, 40, 41, 42 and 47.



**Do Not Postpone Things, Until They Become Urgent.**