ALLIED

2. STATISTICAL METHODS AND THEIR APPLICATIONS I

Objective
To understand and computing statistical Methods by which to develop the programming Skills.

UNIT-I
Introduction - scope and limitations of statistical methods - classification of data - Tabulation of
data - Diagrammatic and Graphical representation of data - Graphical determination of Quartiles ,Deciles and Percentiles.

UNIT-II
Measures of location : Arithmetic mean, median, mode, geometric mean and Harmonic mean and their properties.

UNIT-III
Measures of dispersion : Range, Quartile deviation, mean deviation, Standard deviation, combined Standard deviation, and their relative measures.

UNIT-IV
Measures of Skewness Karl Pearson's, Bowley's, and kelly's and co-efficient of Skewness and kurtosis based on moments.

UNIT-V
Correlation - Karl Pearson - Spearman's Rank correlation - concurrent deviation methods.
Regression Analysis: Simple Regression Equations.

Note : The proportion between theory and problems shall be 20:80

Books for Reference:
1. Fundamental of Mathematical Statistics - S.C. Gupta & V.K. Kapoor - Sultan Chand
2. Statistical Methods - Snedecor G.W. & Cochran W.G. oxford & +DII
3. Elements of Statistics - Mode . E.B. - Prentice Hall
4. Statistical Methods - Dr. S.P. Gupta - Sultan Chand & Sons

STATISTICAL METHODS & THEIR APPLICATIONS - I

UNIT - I

INTRODUTION :- [STATISTICS]

The word "statistics" of English Language have either been derived from the Latin word "status" or German word "statistik". In each case it means, "an organized political state".

In early years, "statistics" was regarded as the "science of statecraft" because it used by the state government to keep records of population, births, deaths, taxes & many other activities.

Defintion of statistics:

Statistics has been defined by different statisticians to cover two separate concepts.

* Descriptive statistics [statistical data]
* statistical Methods.

Descriptive statistics:- It is expressed as pertaining to numerical data. This concept takes statistics in the plural sense. **statistical Methods:** It is expressed as a science, it takes "statistics" in the singular sense.

According to Bowley, "statistics are numerical data, statement of facts in any department of enquiry placed in relation to each other".

According to Boddington, "statistics is a science of estimates and probabilites".

Scope of statistics:

Statistics has pervaded almost all sphere of human activity. Statistical techniques such as sampling are applied by all people. "Every one tastes one or two fruits before buying a bunch of grapes". "Housewives examine only one grain of rice from a boiling pot. Also Even to examines a handful of rice before buying a sack.

From these simple situations to the highest level of research and decision making, statistical tools are useful. The role of statistics and statistical data in planning & administration is known even to the common man. According to Tippett, "Statistics affects everybody & touches life at many points".

Some of the important areas where the knowledge of statistics is usefully applied are as follows:

* statistics & the Government
* statistics & Mathematics
* statistics & Economics
* statistics & Research
* statistics & Natural science.
* statistics in Education, Astronomy & other areas.

Limitations of statistics

* It doesnot deal with individual Measurements.
* It deals only with quantitative characteristics.
* It is only one of the methods of studying a problem.
* It doesnot Reveal the entire.
* It can be misused.
* It donot Necessarily bring out the cause & Effect" Relationship between Phenomena

DATA: The Data constitutes the base. The findings of an investigation depend on the correctness and completness of relevant data.

Types of Data:

* primary data
* Secondary data.

primary data, It is collected by actual observation or measurement or count is called primary data.

Secondary data are those which has already been collected by someone else & which have already bean passed through the statistical process.

classification of data:

* The process of grouping a large number of individual facts or observation on the basis of similarity among the items - Stockton & Clark

* It is the process of arranging data into sequences and groups according to their common characteristics or separating them into different but related parts. -

Tabulation of data:-

* The logical listing of related quantitative data in vertical colums & horizontal rows of numbers with sufficient explanatory & qualifying words phrases & statements in the form of titles, headings & explanatory notes to make clear the full meaning, context & the origin of the data.

* Tabulation in its broadest sense is an orderly arrangement of data in columns & rows.

Difference between classification & Tabulation.

Classification : It is the basis for tabulation.

Tabulation : " " " " " further analysis.

C : It is the basis for simplification

T : " " " " presentation.

C : Data is divided into groups and subgroups on the basis of similarities & dissimilarities.

T : Data is listed according to a logical sequence of related characteristics.

C : It divides the data into classes & subclasses.

T : It presents the data under heading & sub-heading.

Diagrammatic Representation:

A diagram is a visual form for presentation of statistical data, highlighting their basic facts and relationship, It refers to the various types of bars, circles, maps, pictograms cartograms, etc...

Merits or Advantages of Diagrammatic Representation:

* Most of the people are attracted by diagrams
* Technical knowledge or eduction is not necessary.
* Diagrams show the data in proper perspective.
* Time & effort required are less.
* Diagram leave a lasting impression.
* Language is not a barrier.

Demerits or limitations

* Diagrams are approximations.
* Diagrams are intended to supplement tables but not to substitute them.
* Single diagram is insufficient to represent all the data of a complex table.
* Minute differences in value cannot be represented properly in diagrams
* It cannot be analyzed further.

one-Dimensional Diagrams:

* Line Diagram
* Simple Bar Diagram
* Multiple Bar Diagram
* Sub-divided Bar Diagram
* Percentage Bar Diagram.

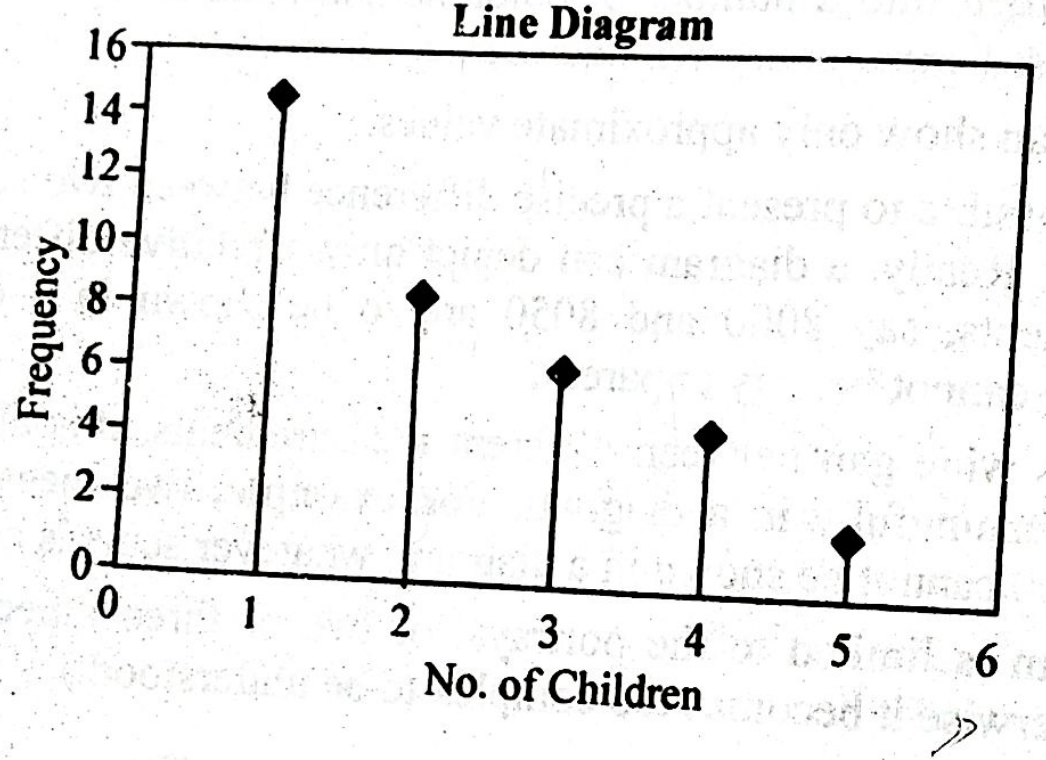
1.4.1.3.1. Line Diagram

Line diagram is used in case where there are many items to be shown and there is not much of difference in their values. Such diagram is prepared by drawing a vertical line for each item according to the scale. The distance between lines is kept uniform. Line diagram makes comparison easy, but it is less attractive.

Example 1: Draw a line chart for the following data:

No. of Children	0	1	2	3	4	5
Frequency	10	14	9	6	4	2

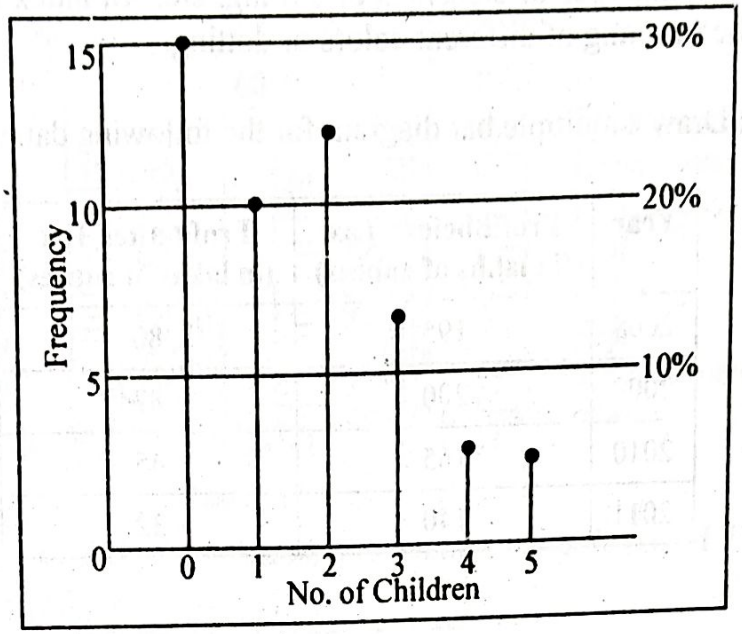
Solution:



Example 2: Draw a line chart for the following data:

No. of Children	0	1	2	3	4	5
Frequency	15	10	13	6	3	3
Percentage	30	20	26	12	6	6

Solution:



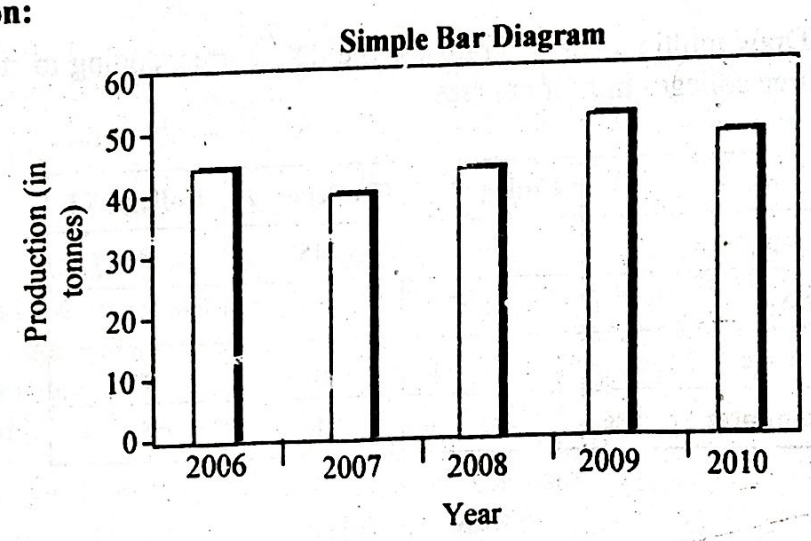
1.4.1.3.2. Simple Bar Diagram

Simple bar diagram can be drawn either on horizontal or vertical base, but bars on horizontal base more common. Bars must be uniform width and intervening space between bars must be equal. While constructing a simple bar diagram, the scale is determined on the basis of the highest value in the series.

Example 3: Represent the following data by a bar diagram:

Year	Production (in tonnes)
2006	45
2007	40
2008	42
2009	55
2010	50

Solution:



1.4.1.3.3. Multiple Bar Diagram

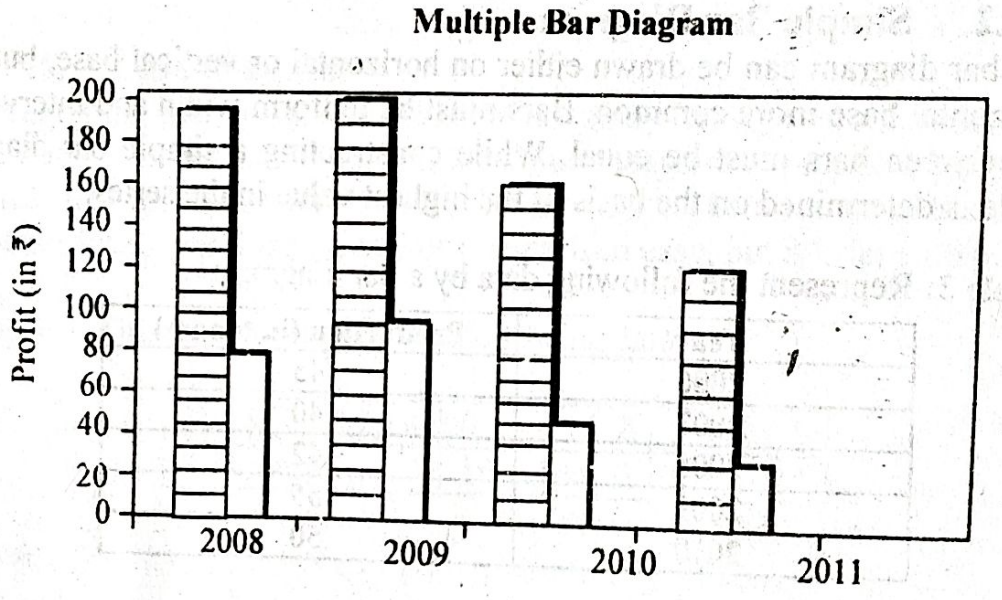
Multiple bar diagram is used for comparing two or more sets of statistical data. Bars are constructed side by side to represent the set of values for comparison.

In order to distinguish bars, they may be either differently colored or there should be different types of crossings or dotting, etc. An index is also prepared to identify the meaning of different colors or dotting.

Example 4: Draw a multiple bar diagram for the following data:

Year	Profit before Tax (in lakhs of rupees)	Profit after Tax (in lakhs of rupees)
2008	195	80
2009	200	87
2010	165	45
2011	140	32

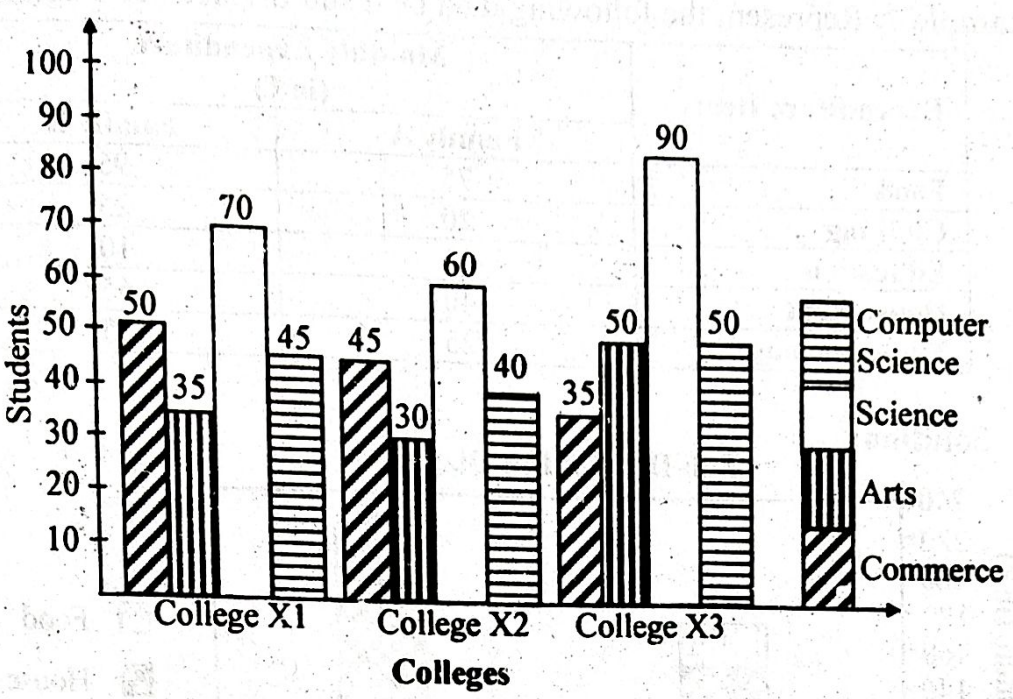
Solution:



Example 5: Draw multiple bar diagram for the data corresponding to students admitted in three colleges in four courses.

	College X1	College X2	College X3
Commerce	50	45	35
Arts	35	30	50
Science	70	60	90
Computer Science	45	40	50

Solution:

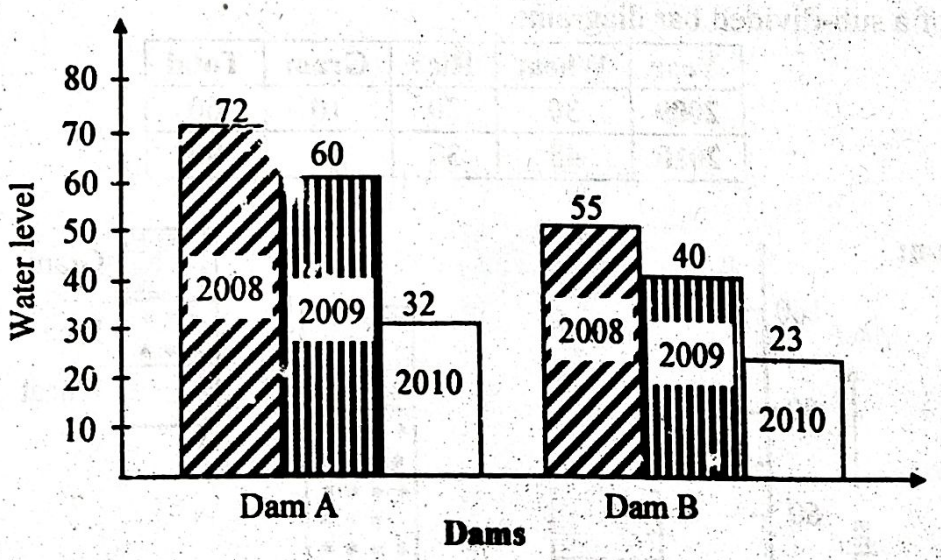


Example 6: The following data corresponds to average water levels of dams A and B during 2008 to 2010:

	Dam A	Dam B
2008	72	55
2009	60	40
2010	32	23

Draw multipie bar diagram for the above data.

Solution:



1.4.1.3.4. Sub-Divided Bar Diagram

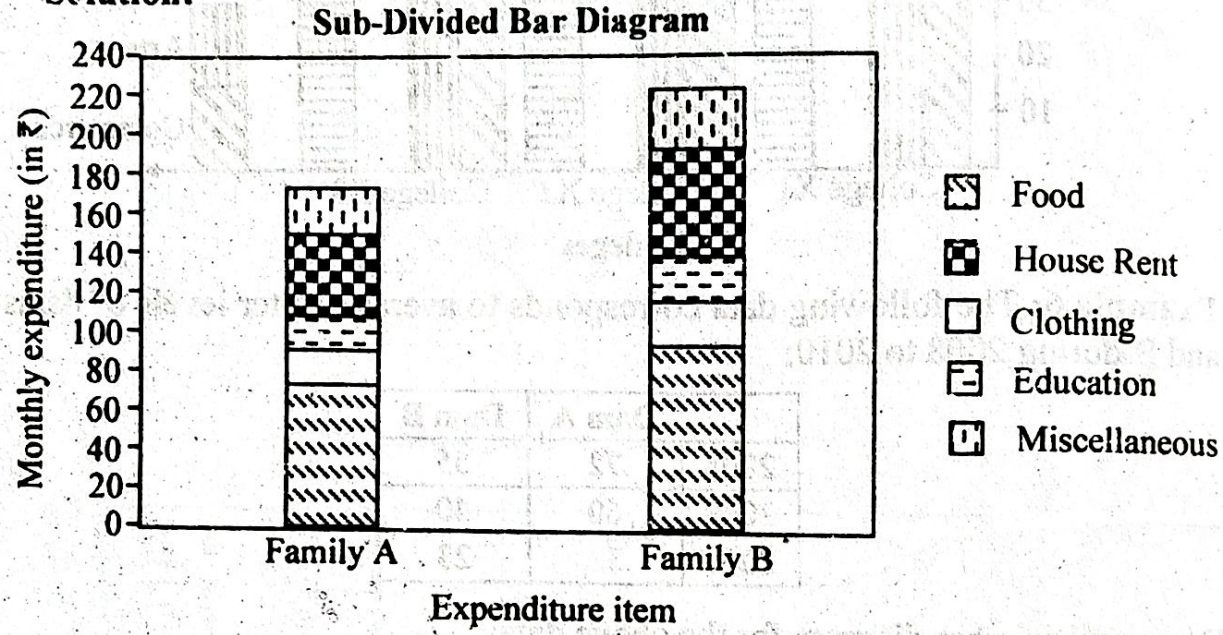
In a sub-divided bar diagram, the bar is sub-divided into various parts in proportion to the values given in the data and the whole bar represent the total. Such diagrams are also called Component Bar diagrams. The sub divisions are distinguished by different colors or crossings or dotting.

The main defect of such a diagram is that all the parts do not have a common base to enable one to compare accurately the various components of the data.

Example 7: Represent the following data by a sub-divided bar diagram:

Expenditure Items	Monthly Expenditure (in ₹)	
	Family A	Family B
Food	75	95
Clothing	20	25
Education	15	10
House Rent	40	65
Miscellaneous	25	35

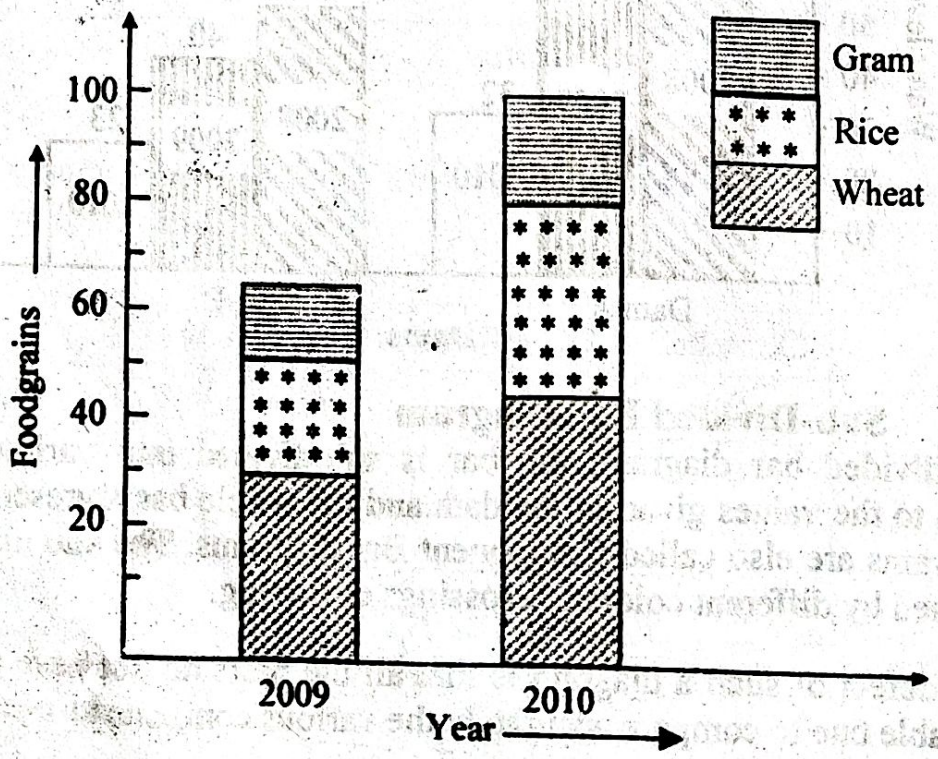
Solution:



Example 8: Present the following data on the production of food grains in the form of a sub-divided bar diagram:

Year	Wheat	Rice	Gram	Total
2009	30	20	10	60
2010	45	30	15	90

Solution:



1.4.1.3.5. Percentage Bar Diagram

This is another form of component bar diagram. Here the components are not the actual values but percentages of the whole. The main difference between the sub-divided bar diagram and percentage bar diagram is that in the former the bars are of different heights since their totals may be different whereas in the latter the bars are of equal height since each bar represents 100 percent. In the case of data having sub-division, percentage bar diagram will be more appealing than sub-divided bar diagram.

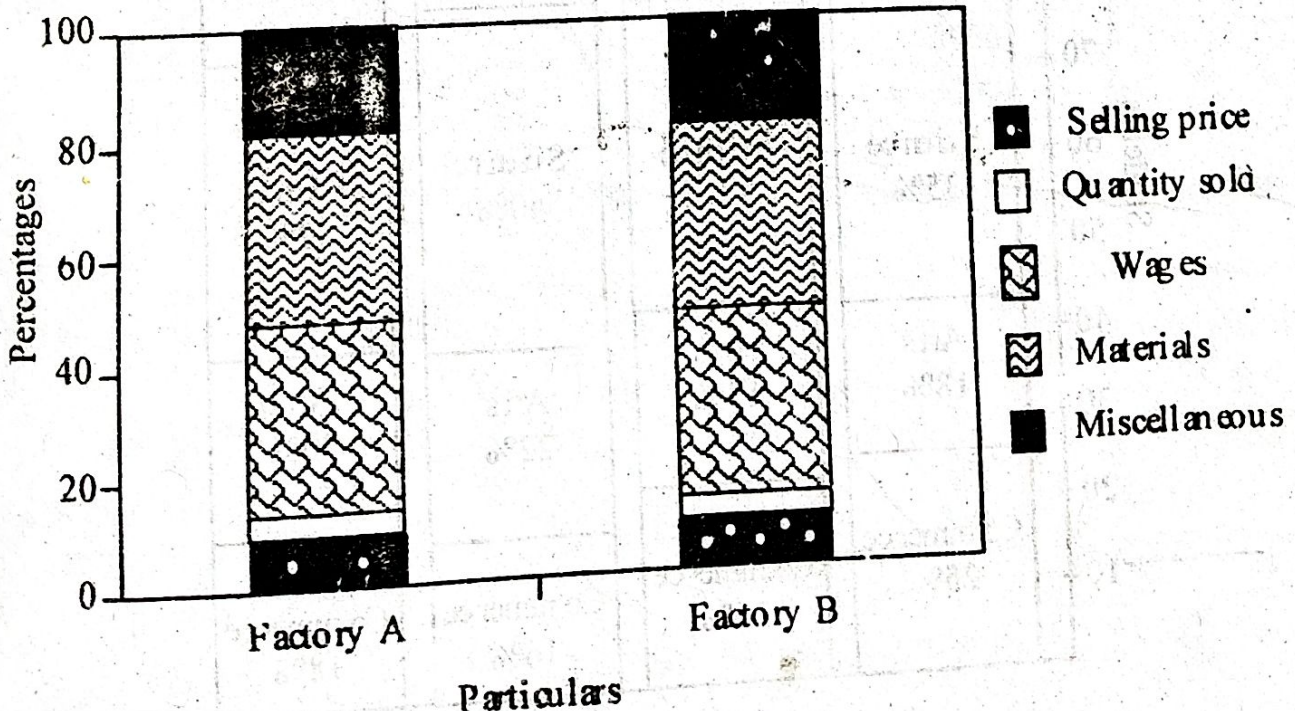
Example 9: Represent the following data by a percentage bar diagram

Particular	Factory A	Factory B
Selling Price	400	650
Quantity Sold	240	365
Wages	3500	5000
Materials	2100	3500
Miscellaneous	1400	2100

Solution: Convert the given values into percentages as followings:

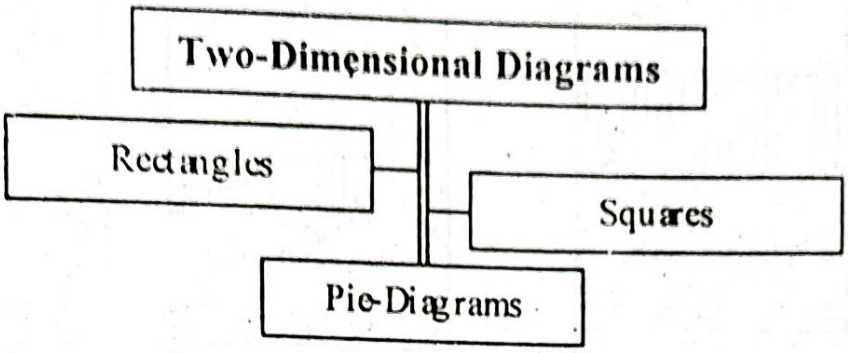
Particulars	Factory A		Factory B	
	₹	%	₹	%
Selling Price	400	5	650	6
Quantity Sold	240	3	365	3
Wages	3500	46	5000	43
Materials	2100	28	3500	30
Miscellaneous	1400	18	2100	18
Total	7640	100	11615	100

Sub-divided Percentage bar Diagram



1.4.1.4. Two-Dimensional Diagrams

In one-dimensional diagrams, only length is taken into account. But in two-dimensional diagrams the areas represent the data and so the length and breadth are both to be taken into account. Such diagrams are also called area diagrams or surface diagrams. The important types of area diagrams are:



1.4.1.4.1. Rectangles

Rectangles are used to represent the relative magnitude of two or more values. The area of the rectangles is kept in proportion to the values. Rectangles are placed side by side for comparison. When two sets of figures are to be represented by rectangles, either of the two methods may be adopted.

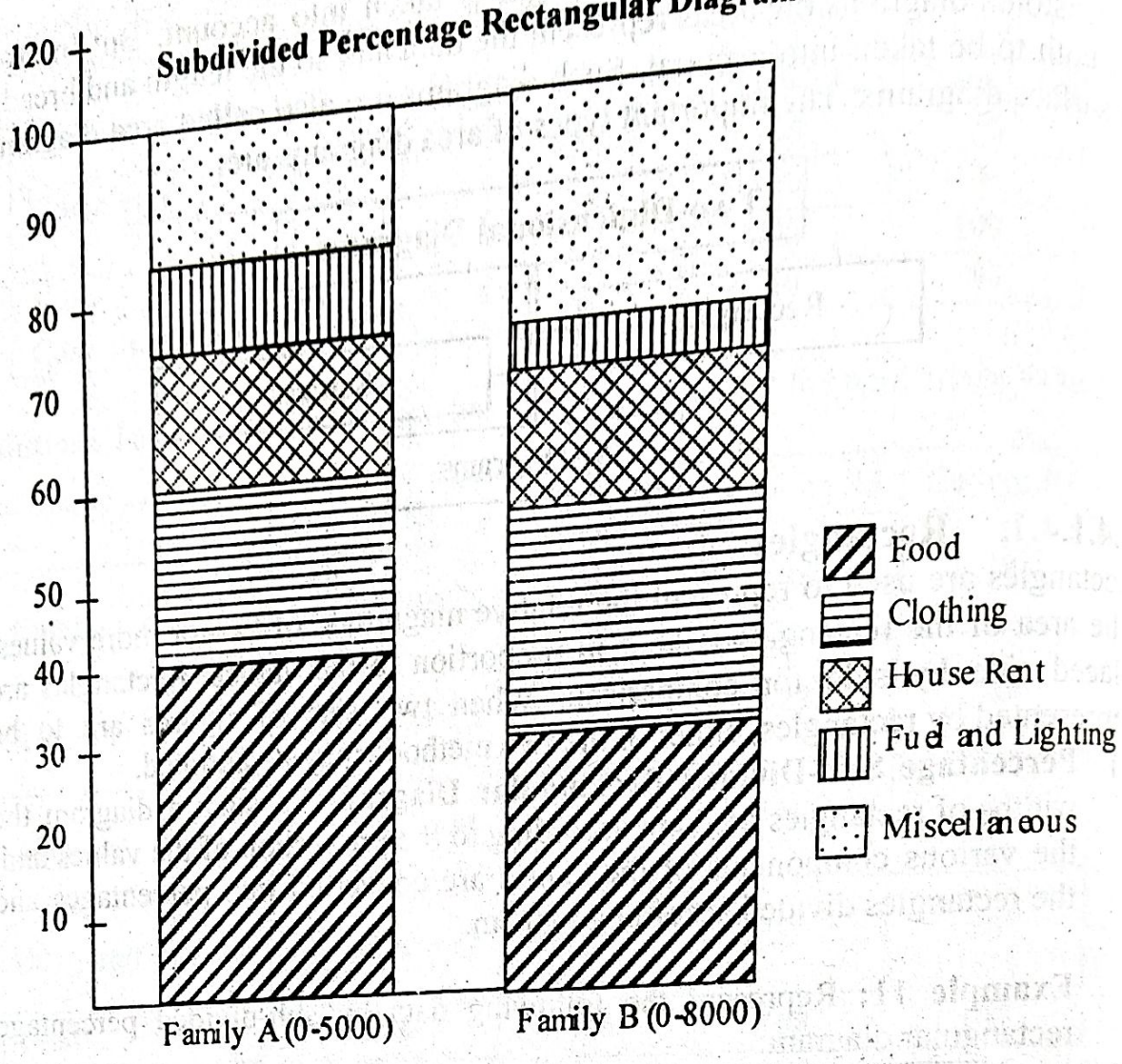
1) **Percentage Sub-Divided Rectangular Diagram:** In such a diagram the widths of rectangles are kept according to the proportion of the values and, the various components of the values are converted into percentages and the rectangles divided according to them.

Example 11: Represent the following data by sub-divided percentage rectangular diagram:

Items of Expenditure	Family A (Income ₹ 5000)	Family B (income ₹ 8000)
Food	2000	2500
Clothing	1000	2000
House Rent	800	1000
Fuel and lighting	400	500
Miscellaneous	800	2000
Total	5000	8000

Solution: The items of expenditure will be converted into percentage as shown below:

Items of Expenditure	Family A		Family B	
	₹	Y	₹	Y
Food	2000	40	2500	31
Clothing	1000	20	2000	25
House Rent	800	16	1000	13
Fuel and Lighting	400	8	500	6
Miscellaneous	800	16	2000	25
Total	5000	100	8000	100



2) **Sub-Divided Rectangles:** Such diagrams are used to show three related phenomena. Per unit cost, quantity of sales and sales revenue can be shown with the help of such a diagram.

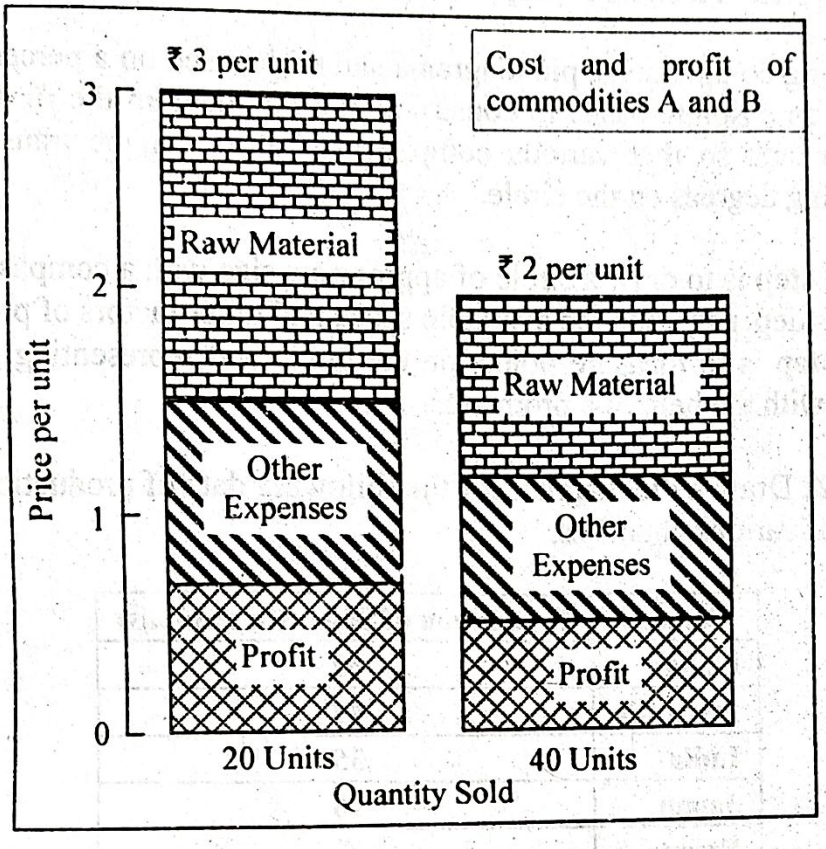
Example 12: Represent the following data by means of a suitable two-dimensional diagram:

	A	B
Prices of commodity	₹ 2 per unit	₹ 3 per unit
Quantity sold	40 units	20 units
Value of raw material	₹ 26	₹ 24
Other expenses of production	₹ 32	₹ 21
Profit	₹ 22	₹ 15

Solution: To depict the above data diagrammatically the following calculations are made.

	Commodity A 40 units @ 2/- per unit		Commodity B 20 units @ 3/- per unit	
	Total	Per Unit	Total	Per Unit
Raw Materials	26	$\frac{26}{80} \times 2 = 0.65$	24	$\frac{24}{60} \times 3 = 1.20$
Other Expenses	32	$\frac{32}{80} \times 2 = 0.80$	21	$\frac{21}{60} \times 3 = 1.05$

Profit	22	$\frac{22}{80} \times 2 = 0.55$	15	$\frac{15}{60} \times 3 = 0.75$
Total	**80**	**2.00**	**60**	**3.00**

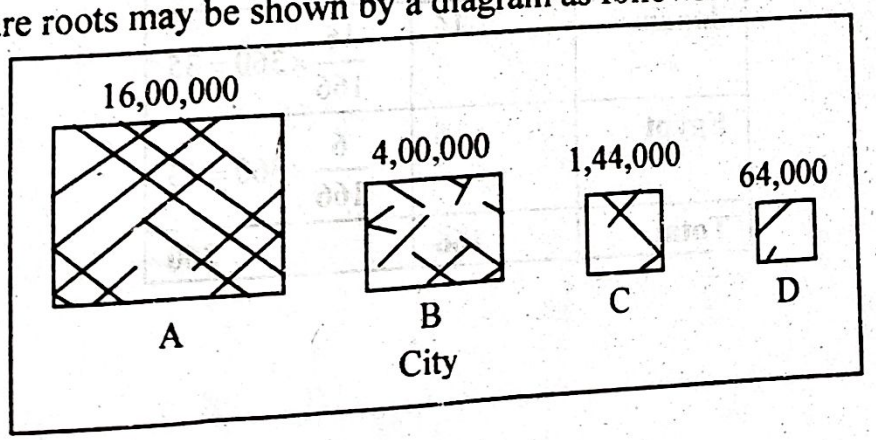


1.4.1.4.2. Squares

The rectangular method of diagrammatic presentation is difficult to use where the values of items vary widely. The method of drawing a square diagram is very simple. One has to take the square root of the values of various item that are to be shown in the diagrams and then select a suitable scale to draw the squares.

Calculation of Square Root			
City	**Population**	**Ratio**	**Square Root**
A	16,00,000	100	10
B	4,00,000	25	5
C	1,44,000	9	3
D	64,000	4	2

These square roots may be shown by a diagram as follows:



1.4.1.4.3. Pie Diagram

Another way of preparing a two-dimensional diagram is in the form of circles. In such diagrams, both the total and the component parts or sectors can be shown. The area of a circle is proportional to the square of its radius.

While making comparisons, pie diagrams should be used on a percentage basis and not on an absolute basis. In constructing a pie diagram the **first step** is to prepare the data so that various components values can be transposed into corresponding degrees on the circle.

The **second step** is to draw a circle of appropriate size with a compass. The size of the radius depends upon the available space and other factors of presentation. The **third step** is to measure points on the circle and representing the size of each sector with the help of a protractor.

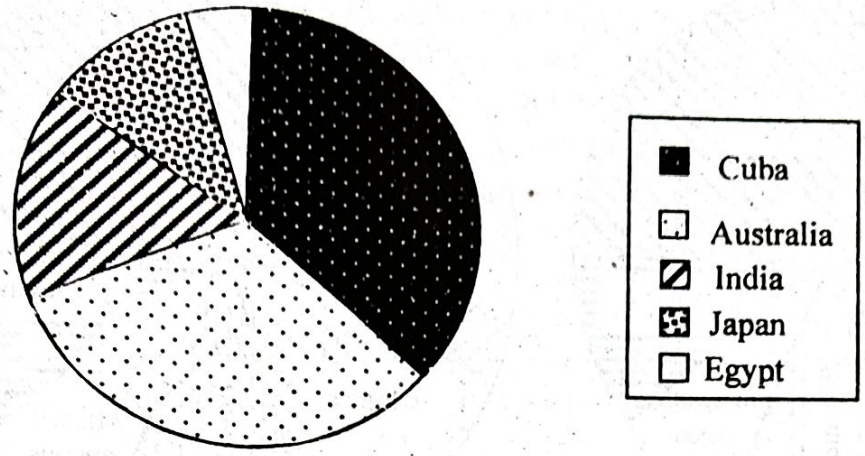
Example 12: Draw a Pie diagram for the following data of production of sugar in quintals of various countries.

Country	Production of Sugar (in quintals)
Cuba	62
Australia	47
India	35
Japan	16
Egypt	6

Solution: The values are expressed in terms of degree as follows:

Country	Production of Sugar	
	In Quintals	In Degrees
Cuba	62	$\frac{62}{166} \times 360 = 134$
Australia	47	$\frac{47}{166} \times 360 = 102$
India	35	$\frac{35}{166} \times 360 = 76$
Japan	16	$\frac{16}{166} \times 360 = 35$
Egypt	6	$\frac{6}{166} \times 360 = 13$
Total	166	360

Pie Diagram

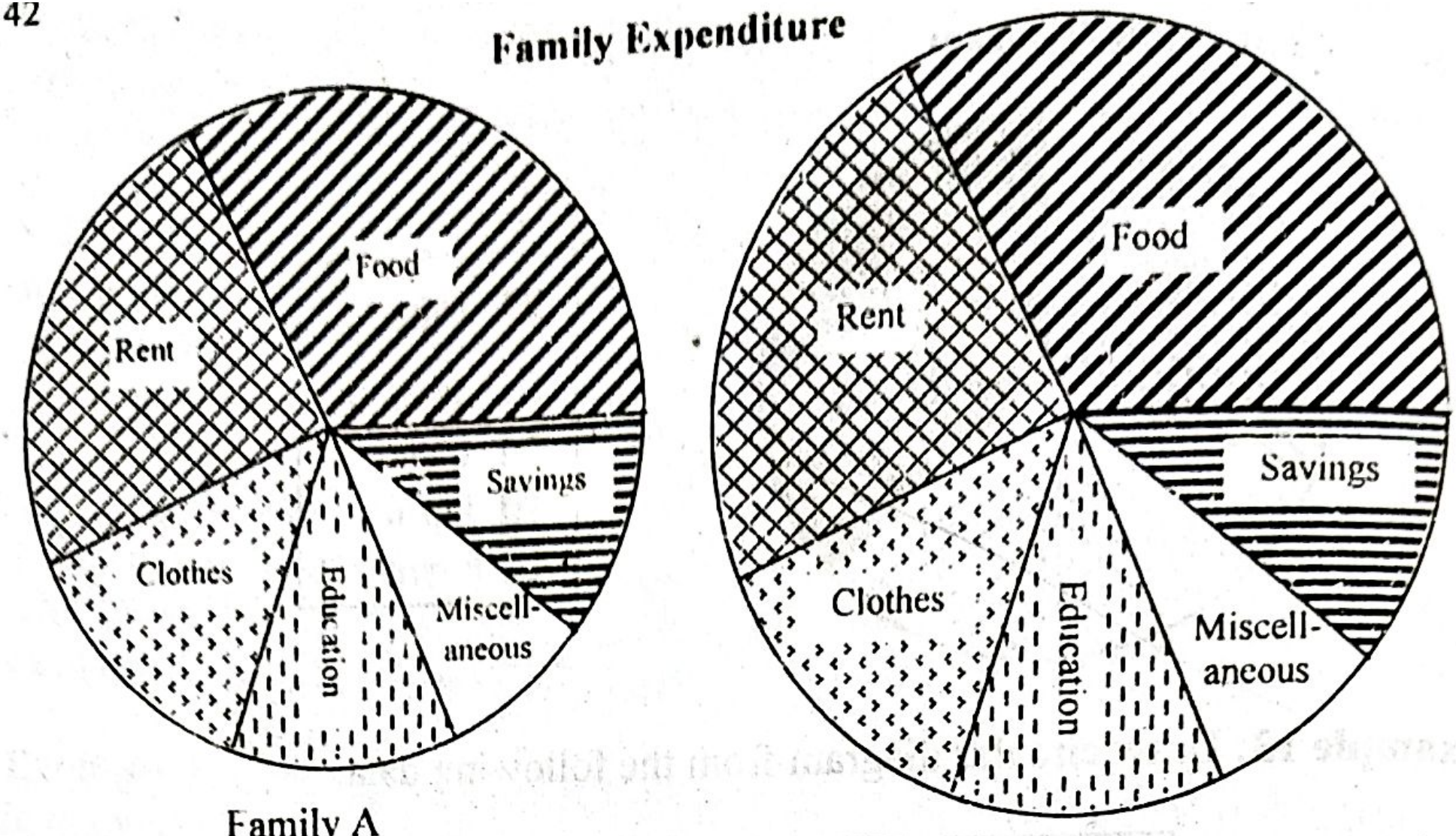


Example 13: Draw circular diagram from the following data:

Type of Commodity	Expenditure in Rupees	
	Family A	Family B
Food	300	500
Rent	200	350
Clothes	125	250
Education	110	225
Miscellaneous	75	125
Savings	90	150

Solution:

Types of Commodity	Family A		Family B	
	Expenditure in Rupees	Degrees	Expenditure in Rupees	Degrees
Food	300	$\frac{300}{900}\times360=120.000$	500	$\frac{150}{1600}\times360=112.500$
Rent	200	$\frac{200}{900}\times360=80.000$	350	$\frac{350}{1600}\times360=78.750$
Clothes	125	$\frac{125}{900}\times360=50.000$	250	$\frac{250}{1600}\times360=56.250$
Education	110	$\frac{110}{900}\times360=44.000$	225	$\frac{225}{1600}\times360=50.625$
Miscellaneous	75	$\frac{75}{900}\times360=30.000$	125	$\frac{125}{1600}\times360=28.125$
Savings	90	$\frac{90}{900}\times360=36.000$	150	$\frac{150}{1600}\times360=33.750$
Total	900	360.000	1,600	360
Radius	286.36		509.09	



1.4.1.5. Three-Dimensional Diagrams

Three-dimensional diagrams are those in which three dimensions wing, length, breadth, and height are taken into account. They are constructed in the form of cubes, spheres, cylinders, and blocks.

(iv) Pie Diagram:

Pie Diagram consists of one or more circles which are divided into a number of sectors.

Suitability: *It is suitable whenever the relative proportions of the components which make up the total are to be revealed. It is used to represent the expenses of families or Governments on different heads and revenues from different sources.*

The pie diagram is so called because the circle looks like a pie and the sectors resemble slices cut from the pie. Pie diagram is an important and a popular means of representation. Circles are more attractive than squares. Even when there are more than four components, pie diagram remains effective unlike a component bar diagram.

Pie diagram has a few limitations. It is less effective than bar diagrams for comparison and interpretation. More than three sets of values could not be purposefully presented in a single diagram. Further, there should not be more than eight sectors in a circle.

Case 1: One Circle

Step 1: Whenever one set of actual amounts or percentages are given, find the corresponding angles in degrees by using the following formula:

$$\text{Angle} = \frac{\text{Actual Value}}{\text{Total of Actual Values}} \times 360 \quad \text{(or)}$$

$$= \frac{\text{Percentage}}{100} \times 360$$

$$= \text{Percentage} \times 3.6$$

Angles are taken to the nearest integral values. When the values obtained by the above formula are fractions but have been rounded off to the nearest integers, the total of the angles may not be 360° sometimes. Then one or more of the rounded off values are to be revised reasonably to get the total as 360.

Step 2: Using a compass draw a circle of any convenient radius. Convenient in the sense that it looks neither too small nor too big on the paper.

Step 3: Using a protractor divide the circle into sectors whose angles have been calculated in step 1. Sectors are to be in the order of the given items.

Step 4: Sketch one colour or design to each sector.

Step 5: Write the title, index and identification number.

Example 9: Draw a suitable diagram to represent the following submitted as a part of the budget proposal of the Govt. of India for the year 1995-96.

Item of Expenditure	Percentage
1.Interest	26
2.Defence	13
3.Subsidies	6
4.Other non-plan expenditure	10
5.States share of taxes and duties	15
6.Non-plan assistance to State and UT Govts.	6
7.State and UT plan assistance	10
8.Central plan	14
Total	100

Solution:

Item of Expenditure	Percentage	Angle in degrees
1.Interest	26	93
2.Defence	13	47
3.Subsidies	6	22
4.Other non-plan expenditure	10	36
5.States share of taxes and duties	15	54
6.Non-plan assistance to State and UT Govts.	6	22
7.State and UT plan assistance	10	36
8.Central plan	14	50
Total	100	360

BUDGET PROPOSAL OF GOVT. OF INDIA FOR 1995-96

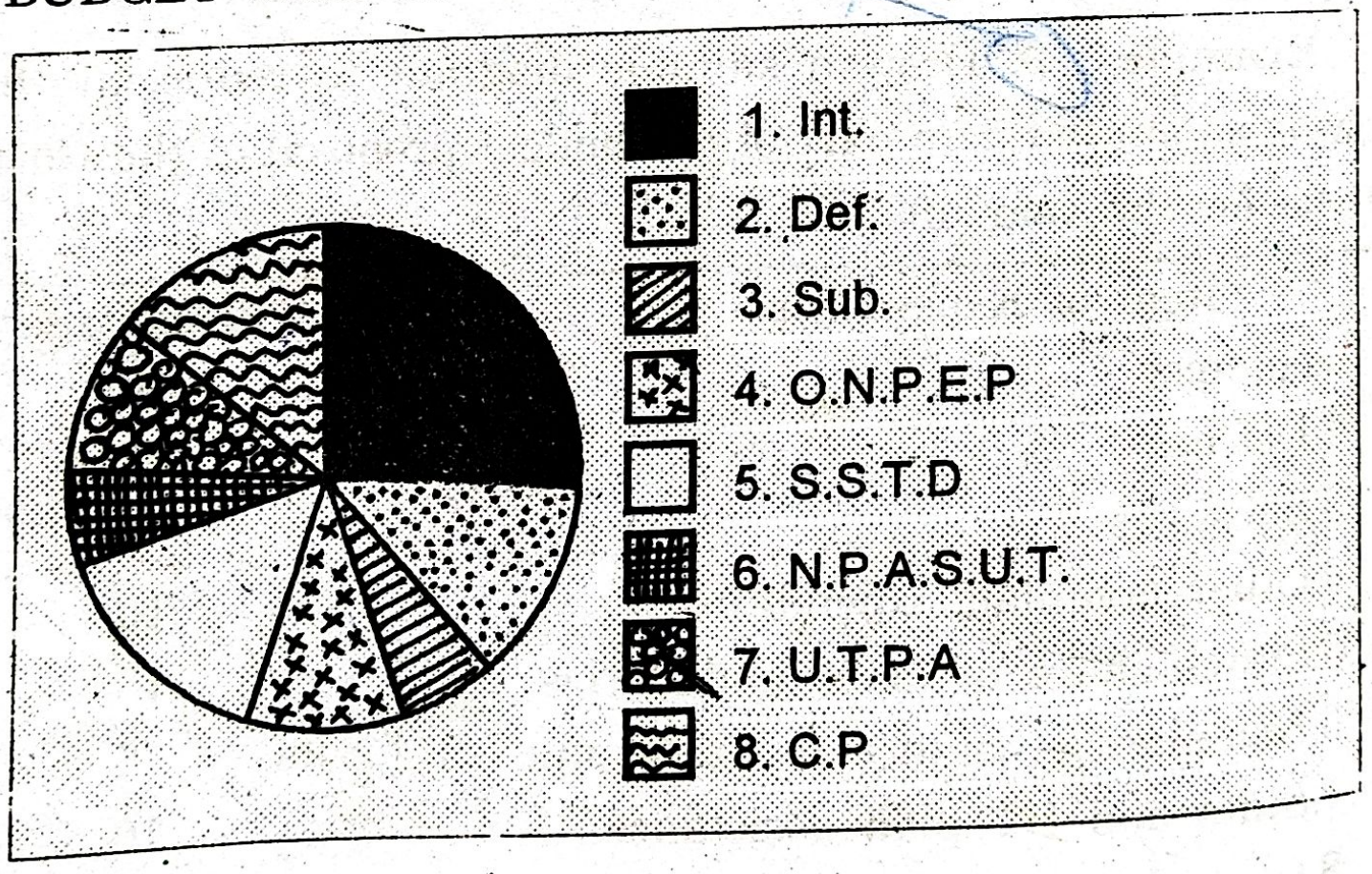


Diagram 9 Pie Diagram

Graphical Representation:

A Graph is a visual form of Presentable of statistical data. A graph is more attractive than a table of figure. Even a common man can understand the message of data from the graph.

Uses of graph

It is useful for analysis of time series business forecasting, interpolation, extrapolation, and inverse interpolation.

It is easily to be found, median, mode & quartiles etc...

Widely used in statistical analysis, presentation of data & research. Trends & tendencies are known.

General rules:-

* A suitable title is to be given to every graph, it is to be placed at the top/bottom.
* Proper proportion bet/.. the lengths of a graph in the two directions enhances the looks. The suggested proportion is 1 : 1½ & also, size, scale, Index, Axis, origin simplicity. Neatness & Foot-note & source.

Graphs of frequency distributions

* Histogram
* ogive
* Frequency curve
* Frequency polygon.

1.4.2.4.1. Histogram

A histogram is a bar chart or graph showing the frequency of occurrence of each value of the variable being analyzed. In histogram, data are plotted as a series of rectangles. Class intervals are shown on the 'X-axis' and the frequencies on the 'Y-axis'.

The height of each rectangle represents the frequency of the class interval. Each rectangle is formed with the other so as to give a continuous picture. Such a graph is also called staircase or block diagram.

However, we cannot construct a histogram for distribution with open-end classes. It is also quite misleading if the distribution has unequal intervals and suitable adjustments in frequencies are not made.

Advantage of Histogram

The advantages of histogram are:

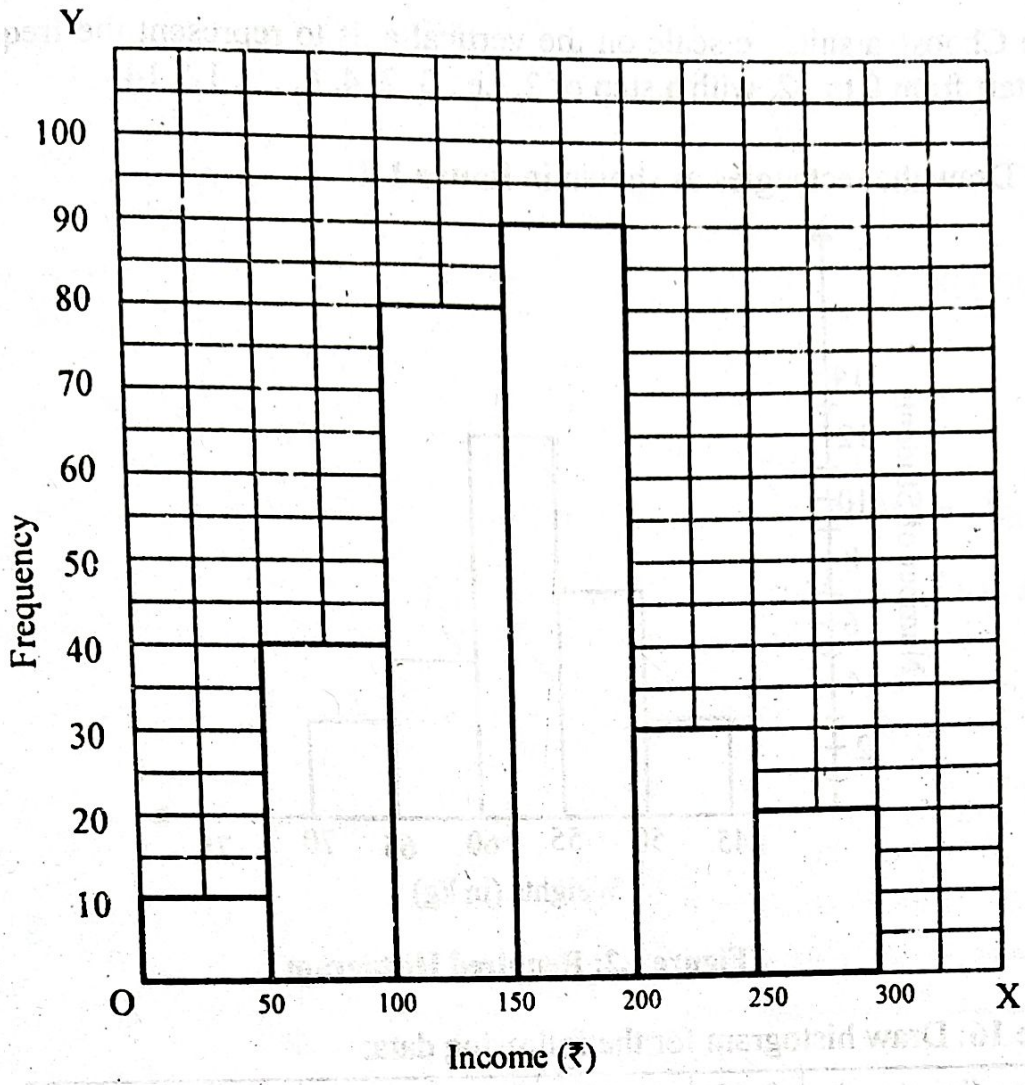
1) Each rectangle shows distinctly separate class in the distribution.
2) The area of each rectangle in relation to all other rectangles shows the proportion of the total number of observations pertaining to that class.

Example 14: Represent the data given below by histograms:

Income in Rupees	Frequency
0 – 50	10
50 – 100	40
100 – 150	80
150 – 200	90
200 – 250	30
250 – 300	20

Solution: The following step is involved for construction of graph:

a) Let the scale for OX-axis be 1 cm. = 50 (income in ₹) and the scale for OY-axis be 1 cm. = 10 units of frequency.



Histogram with Equal Class-Interval

b) The rectangles are drawn taking into consideration 1 cm. = 50 (income in ₹) as width and the respective frequencies (being represented in the scale of 1 cm. = 10 units frequencies). The set of rectangles so obtained represent the histogram.

Example 15: The following is the frequency distribution of weights of 30 students of class IX of a school. Draw a histogram to represent the data:

Classes	45-50	50-55	55-60	60-65	65-70	Total
Frequency	3	7	12	5	3	30

Solution: For drawing a histogram we go through the steps similar to those of a bar graph.

They are given below:

Step 1: On a paper, we draw two perpendicular lines and call them horizontal and vertical axes.

Step 2: Along the horizontal axis, we take classes of equal width: 45-50, 50-55, ... As the axis starts from 45-50, we take one interval 40-45 before it and put a kink on axis before that.

Step 3: Choose a suitable scale on the vertical axis to represent the frequency. It can start from 0 to 12, with a step of 2, i.e., 0, 2, 4, 6, ..., 12, 14.

Step 4: Draw the rectangles as shown in **figure 1.2:**

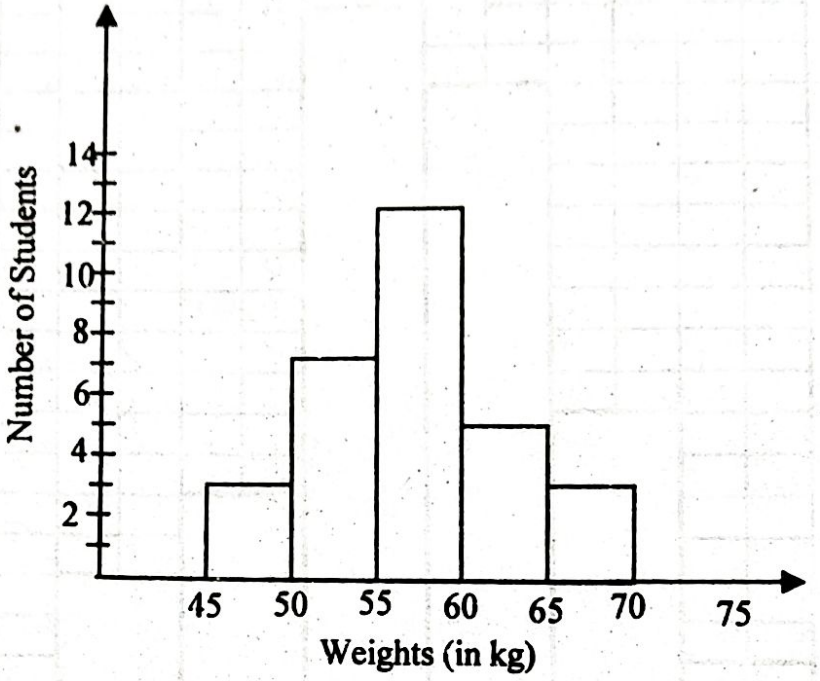
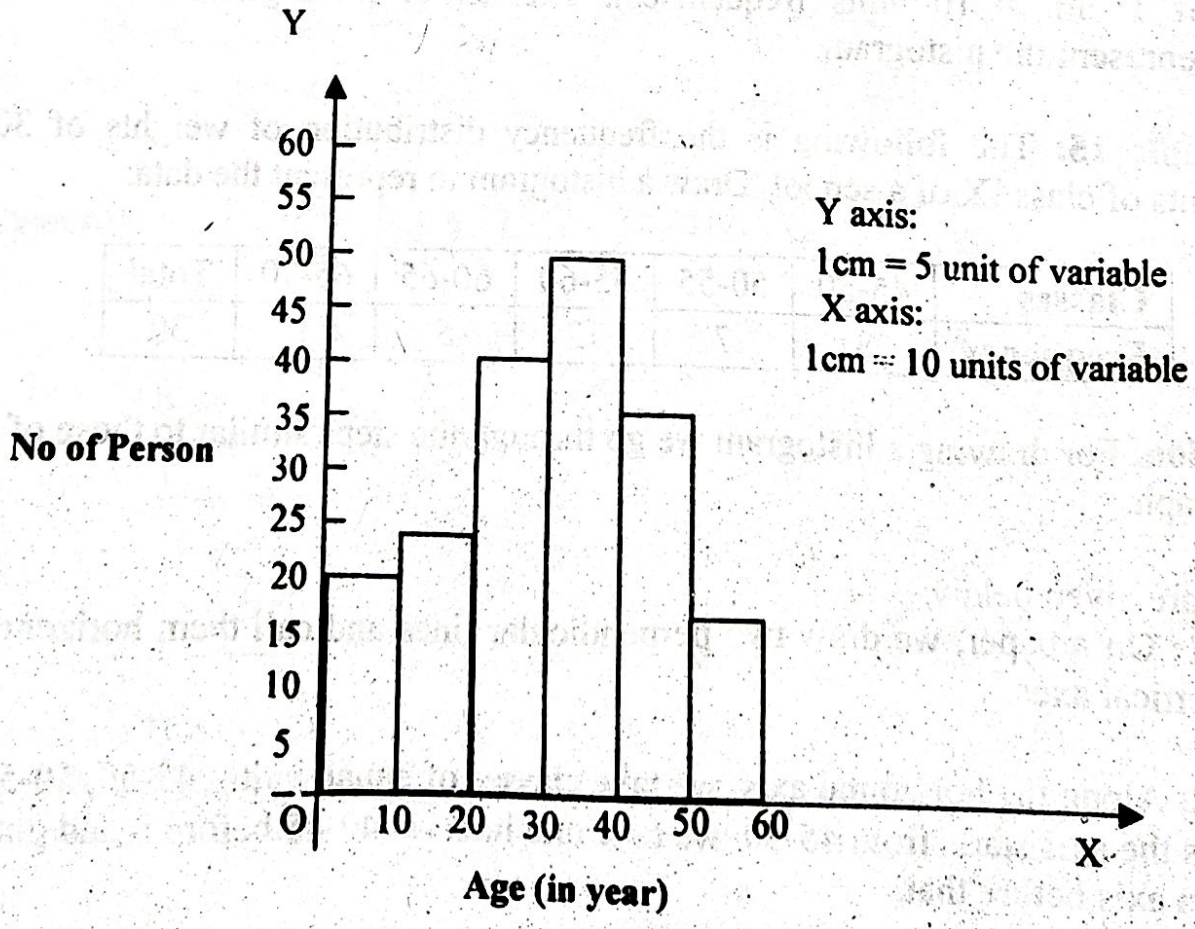


Figure 1.2: Required Histogram

Example 16: Draw histogram for the following data:

Age (in years)	0-10	10-20	20-30	30-40	40-50	50-60
No. of Persons	20	24	40	50	35	17

Solution:



1.4.2.4.2. Frequency Polygon

If we mark the mid points of the top horizontal sides of the rectangles in a histogram and join them by a straight line, the figure so formed is called a Frequency Polygon. This is done under the assumption that the frequencies in class intervals are evenly distributed throughout the class. The area of the polygon is equal to the area of the histogram, because the area left outside is just equal to the area included in it.

Advantage of Frequency Polygon

1) The frequency polygon is simpler as compared to its histogram.
2) The frequency polygon shows more vividly an outline of the data pattern.

As the number of classes and the number of observations increase, so also the frequency polygon becomes increasingly smooth.

Example 17: Illustrate the following by a frequency polygon:

Scores	Frequency	Scores	Frequency
90 – 99	02	50 – 59	14
80 – 89	12	40 – 49	3
70 - 79	22	30 - 39	1
60 - 69	20	20 - 29	1

Solution: The following steps are involved for construction of graph

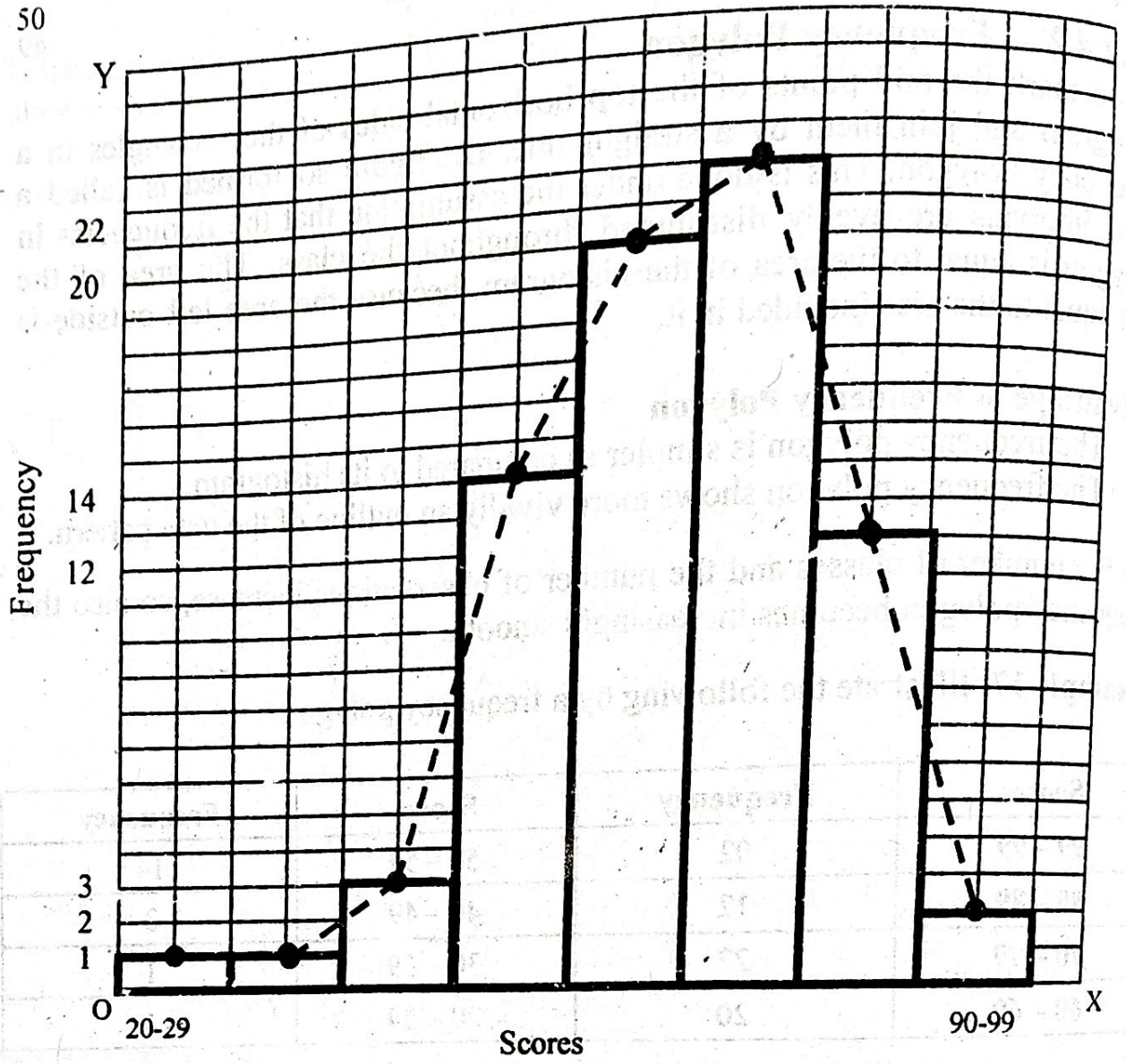
i) For the purpose of simplification and to have the things in order, the scores and frequencies may firstly be re-written as:

Scores	Frequency
20 – 29	1
30 – 39	1
40 - 49	3
50 - 59	14
60 – 69	20
70 – 79	22
80 - 89	12
90 - 99	1

ii) A suitable scale is to be adjusted for both the OX and the OY axis:
OX-axis (Scores): 1 cm = 10 group (scores).
OY-axis (Frequency): 1 cm = 2 unit of frequency.

iii) On the basis of the above scales, the histogram is drawn.

iv) The mid-values in the upper surfaces of the rectangles are plotted and then they are joined. It gives the frequency polygon.



Frequency Polygon

Example 18: Draw a frequency polygon for the following data:

Pocket Allowance (in ₹)	0-50	50-100	100-150	150-200	200-250	250-300
Number of Students	16	25	13	26	15	5

Solution: To draw a frequency polygon without drawing a histogram we go through the following steps:

Step 1: Draw two lines perpendicular to each other.

Step 2: Find the class-marks of different classes. They are 25, 75, 125, 175, 225, 275.

Step 3: Plot the ordered pairs A(25, 16), B(75, 25), C(125, 13), D(175, 26), E(225, 15), and F(275, 5)

Step 4: Join the points A, B, C, D, E, and F and complete the polygon.

The frequency polygon is given below:

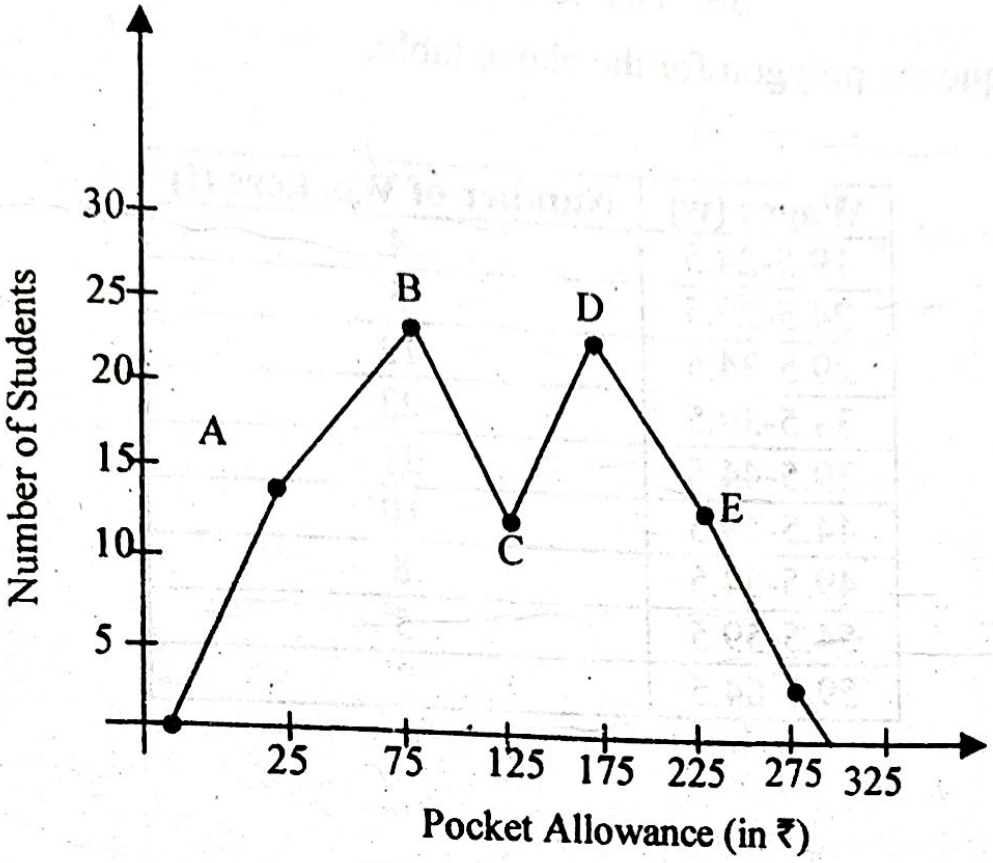


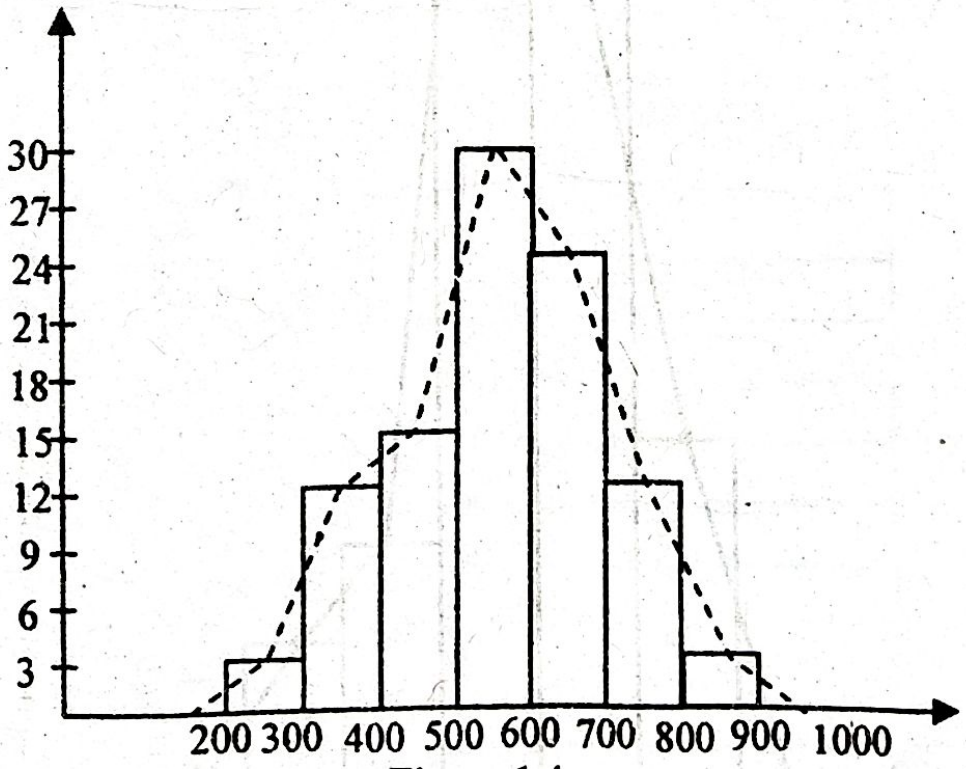
Figure 1.3

Example 19: The daily earnings of 100 shopkeepers are given below:

Daily Earnings (in ₹)	200-300	300-400	400-500	500-600	600-700	700-800	800-900
No. of Shops	3	12	15	30	25	12	3

Draw a histogram and a frequency polygon to represent the above data.

Solution:



1.4.2.4.4. Ogives or Cumulative Frequency Curves

When cumulative frequencies are plotted on a graph, then the frequency curve obtained is called 'ogive' or 'cumulative frequency curve'. Ogives determine median, quartiles, percentiles, etc. The class limits are shown along the X-axis and cumulative frequencies along the Y-axis. In drawing an ogive, the cumulative frequency is plotted at the upper limit of the class interval, the successive points are later joined together to get an ogive curve.

There are two methods of constructing ogives, viz.:

1) Less than ogive.
2) More than ogive.

In less than ogive method we start with the upper limits of the classes and go adding the frequencies. When these frequencies are plotted, we get a rising curve. In more than ogive method, we start with the lower limits of the classes and from the total frequencies we subtract the frequency of each class. When these frequencies are plotted we get a declining curve.

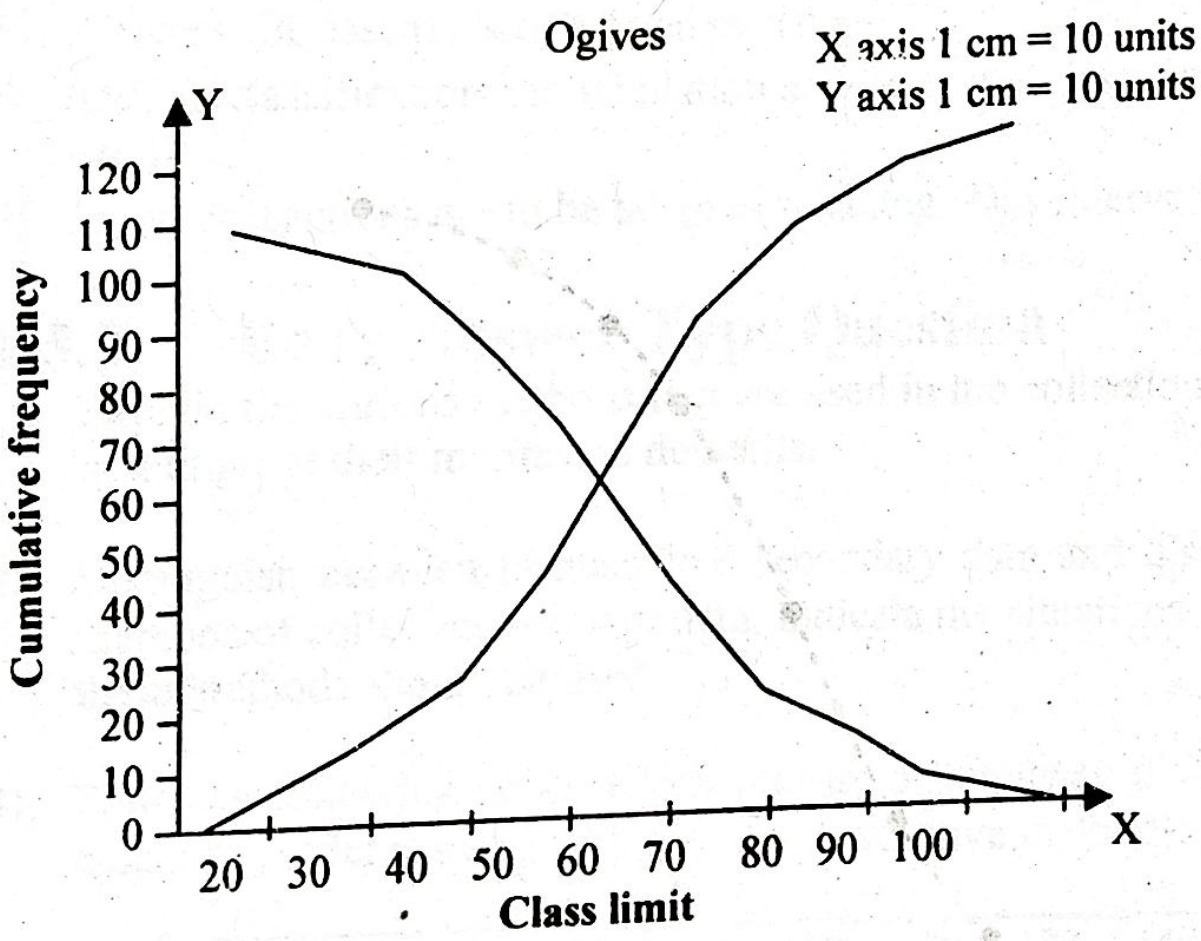
Example 22: Draw the less-than and more than Ogives for the following data:

Class Interval	Frequency
20-30	4
30-40	6
40-50	13

50-60	25
60-70	32
70-80	19
80-90	8
90-100	3

Solution:

Class Limit	Less than Ogive	More than Ogive
20	0	110
30	4	106
40	10	100
50	23	87
60	48	62
70	80	30
80	99	11
90	107	3
100	110	0



Quartiles

The quartiles of a data set divide the data into four equal parts, with one-fourth of the data values in each part. The second quartile position is the median of the data set, which divides the data set in half. To find the median position of the data set, divide the total number of data values (n) by 2. If there are an even number of data values, the median is the value that is the average of the value in the position and the + 1 position. (If there are an odd number of data values, the median is the value in the position.)

For example, if the data set has 20 values, then the median is the average of the data values in the = 10th and + 1 = 10 + 1 = 11th position.

Deciles: Deciles and percentiles are usually applied to large data sets. Deciles divide a data set into ten equal parts. One example of the use of Deciles is in school awards or rankings. Students in the top 10% or highest decile – may be given an honor cord or some other recognition. If there are 578 students in a graduating class, the top 10%, or 58 students, may be given the award. At the opposite end of the scale, students who score in the bottom 10% or 20% on a standardized test may be given extra assistance to help boost their scores.

Percentiles : Percentiles divide the data set into groupings of 1%. Standardized tests often report percentile scores. These scores help compare students' performances to that of their peers (often across a state or country). The meaning of a percentile score is often misunderstood. A percentile score in this situation reflects the percentage of students who scored at or above that particular group of students. For example, students who receive a percentile ranking of 87 on a particular test received scores that were equal to or higher than 87% of students who took the test. For those who do not understand these scores, they often mistake them for the score the student received on the test.

SOME IMPORTANT QUESTIONS

1.State any two limitations of statistics

2.Write any two nature of statistics.

3. What are the types of Bar diagrams?

4.Define class-intervals.

5.What do you mean by classification of data?

6. Define frequency polygon.

7. state the limitations of graphs.

8.What is the scope of Statistics?

9.What is Descriptive Statistics?

10. What do you mean by Primary and secondary data?

11.State the difference between Classification and Tabulation.

12.Explain different types of classification.

13. Write the general rules for diagrams and graphs.

14.Discuss about bar diagrams.

15.Enumerate the importance of statistics.

16. Discuss about Quartile and percentiles.

17.Draw a pie chart from the data

Items.	Expenditures (rs)
Food	87
Clothing	24
Recreation	11
Education	13
Rent	25
Others	20

2. In a Zoological park there are 1000 creatures as per the following table given below:

Beast Animals	Other Land Animals	Birds	Water Animals	Reptiles
150	400	225	175	50

Represent the above data by a pie chart.

3. Various modes of transport used by 1260 students in a given school are given below:

School Bus	Private Bus	Bicycle	Rickshaw	On foot
350	245	210	175	280

Represent the above data by a pie chart.