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DATA HANDLING

IMPORTANT POINTS:

1. The word data means information (its exact dictionary meaning is: given facts). Statistical data are of two types

(ii) Secondary data (i) Primary data

2. When an investigator collects data himself with a definite plan or design in his (her) mind, it is called Primary data.

3. Data which are not originally collected rather obtained from published or unpublished sources are known as Secondary data.

4. After collection of data, the investigator has to find ways to condense then in tabular form in order to study their silent features. Such an arrangement is called Presentation of data.

5. Raw data when put in ascending or descending order of magnitude is called an array or arranged data.

6. The number of times an observation occurs in the given data is called frequency of the observation.

- 7. Classes/class intervals are the groups in which all the observations are divided.
- 8. Suppose class-interval is 10-20, then 10 is called lower limit and 20 is called upper limit of the class
- 9. Mid-value of class-interval is called Class-mark

lower limit + upperlimit Class-mark = 2

Class-mark = lower limit + $\frac{1}{2}$

(difference between the upper and lower limits)

10. If the frequency of first class interval is added to the frequency of second class and this sum is added to third class and so on then frequencies so obtained are known as Cumulative Frequency (c.f.).

11. There are two types of cumulative frequencies (a) less than, (b) greater than

IMPORTANT FACTS AND FORMULAE :

1. Experiment: An operation in which can produce some well-defined outcomes is called an experiment.

2. Random Experiment : An Experiment in which all possible outcomes are known and the exact output cannot be predicated in advance, is called a random experiment.

3. Examples of Performing a Random

Experiment :

(i) Rolling an unbiased dice.

(ii) Tossing a fair coin.

(iii) Drawing a card from a pack of well-shuffled cards.

(iv) Picking up a ball of certain colour from a bag containing balls of different colours.

4. Details :

(i) When we throw a coin. Then either a Head (H) or aTail (T) appears.

(ii) A dice is a solid cube, having 6 faces, marked 1,2, 3, 4, 5, 6 respectively. When we throw a die, the outcome is the number that appears on its upper face.

(iii) A pack of cards has 52 cards. It has 13 cards of each suit, namely Spades, Clubs, Hearts and Diamonds. Cards of spades and clubs are black cards.

Cards of hearts and diamonds are red cards.

There are 4 honours of each suit.

These are Aces, Kings, Queens and Jacks.

These are called face cards.

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Sum of all observations

Mean = Number of observations

FREQUENCY DI STRI BUTI ON

Frequency : In a given data the number of times a particular observation occurs is called its frequency. It is usually denoted by (f_i) .

Frequency Distribution tables : A table showing the frequencies of the various observation of a data is called a frequency distribution table of simply a frequency table.

Tally marks :

(i) When the number of observations is large, we make use of tally marks ([]]) to find the frequencies.

(ii) Tallies are usually marked in a bunches of five. [The fifth tally in a bunch is usually marked diagonally across the earlier (μ) The fifth one crossing the other four diagonally (μ) which represents five.

Ex.2 The marks scored by 30 students of IX class, of a school in the first test of Mathematics out of 50 marks are as follows :

6	32	10	17	22	28	0	48	6	22
32	6	36	25	48	10	32	48	28	22
22	22	28	26	17	36	10	22	28	0

From the observation of given raw data, it is difficult to judge the standard of the class correctly but if we prepare a table showing how many students scored 0, how many 6, how many 12, etc. then it becomes more easy to understand the standard of the class. The number of times a mark is repeated is called its frequency. It is denoted by f.

The following table is obtained from the above data :

Marks Obtained	Tally mark	Frequency
0	П	2
6	111	3
10	H.I	3
17		2
22	HH11	6
25	I	1
26	I	1
28	1111	4
32	111	3
36	11	2
48	111	3

- Ex.3 In a study of number of accidents per day, the observations for 30 days were obtained as follows : 4, 3, 5, 6, 4, 3, 2, 5, 4, 2, 6, 2, 1, 2, 2, 0, 5, 4, 6, 1, 3, 0, 5, 3, 6, 1, 5, 5, 2, 6. Prepare a frequency table.
- Sol. Arranging the data in ascending order, we get

0, 0, 1, 1, 1, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 5, 5, 5, 6, 6, 6, 6, 6 Now, we represent the above data in the tubular from as shown below :

GRAPHICAL METHOD OF REPRESENTING DATA

Some of the forms to represent data graphically are

(a) A pictograph	(b) A bar graph	(c) Double bar graph	(d) Histogram
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(a) A Pictograph

In Pictograph, we represent data with the help of symbol.

 \overline{OO} = 50 Cycle \leftarrow one symbol stands for 50 Cycle.

Amit	কৃত কৃত কৃত কৃত	50 × 4	= 200
Sachin	কুত কুত কুত	50 × 3	= 150
Manish	අදු අදු අදු අදු අදු	50 × 5	= 250
Ankit	কুত কুত	50 × ?	= ?

(i) How many Cycle does Ankit has?

(ii) Who has maximum Cycle?

(iii)Who has minimum Cycle?

(b) A Bar Graph

A bar graph is a pictorial representation of numerical data in the form of rectangles (or bars) of equal width and varying heights.

These rectangles are drawn either vertically or horizontally, keeping equal space between them. The height (or length) of a rectangle depends upon the numerical value it represents.

Note : Bar graphs of grouped data are also called histograms.

Algorithm to draw a bar graph :

We can draw the graph by following the steps given below.

Step-I : On a graph paper, draw a horizontal line OX and a vertical line OY. These lines are called the x-axis and the y-axis respectively.

Step-II : Mark points at equal intervals along the x-axis. Below these points write the names of the data items whose values are to be plotted.

Step-III : Choose a suitable scale. On that scale determine the heights of the bars for the given numerical values.

Step-IV : Mark off these heights parallel to the y-axis from the points taken in Step-II.

Step-V : On the x-axis, draw bars of equal width for the heights marked in Step-IV. The bars should be centrad on the points marked on the x-axis. These bars represent the given numerical data.

(c) Double Bar Graph

Double bar graph is used to compare the two sets of data simultaneously.



Ex.7 Read the following histogram and answer the questions given at the end.



- (i) What information is depicted by the histogram?
- (ii) What is the most common age group? How many teachers are there in this group?
- (iii) What is the number of teachers who are more than 35 years of age but less than 40 years?
- (iv) How many teachers are 40 years or older?
- (v) Which groups contain the same number of teachers? (vi) What are the class marks of the classes?
- Sol. (i) The histogram shows the distribution of ages (in year) of 40 teachers in a school.
 - (ii) The most common age group is 30–35 and the number of teachers in this age group is 11.
 - (iii) The number of teachers who are more than 35 years of age but less than 40 years is 8.
 - (iv) There are 12(5 + 4 + 3) teachers who are 40 years or older.
 - (v) The group 20–25 and 50–55 contain the same number of teachers.
 - (vi) The class mark of 20–25 is $\frac{20+25}{2}$, i.e. 22.5

Similarly, the class mark of 25–30 is 27.5 the class mark of 30–35 is 32.5

the class mark of 35–40 is 37.5 the class mark of 40–45 is 42.5 the class mark of 45–50 is 47.5 the class mark of 50–55 is 52.5

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In this section, a pie chart will be given in that we would need to find the allocations for different heads. With the help of central angle (or sector area).

(i) Central angle for a component =
$$\left(\frac{\text{valueof the component}}{\text{Sumof the values of all component}} \times 360\right)^{\circ}$$

(ii) Value of a component = $\left(\frac{\text{Sum of the component values × Central angle of the component}}{360^{\circ}}\right)$
(iii) Percentage value of a component = $\left(\frac{\text{Central angle of the component × 100}}{360^{\circ}}\right)$
These formulae will be used to find the values of various components of the data from its pie-chart
Ex.9 The main source of energy used by each house in a street is listed below :
 $\frac{\text{Source of energy}}{\text{No. of houses}} \frac{\text{Electricity}}{20} \frac{\text{Solar}}{10} \frac{\text{Gas}}{26} \frac{\text{Oil}}{6}$
Represent the above data by a pie chart.
Sol. We know that central angle for a variable = $\left(\frac{\text{valueof the component}}{\text{Sum of the values of all component}} \times 360\right)^{\circ}$
Total frequency = 20 + 10 + 12 + 6 = 48
Central angle for electricity = $\frac{20}{48} \times 360^{\circ} = 150^{\circ}$
Central angle for solar = $\frac{10}{48} \times 360^{\circ} = 75^{\circ}$
Central angle for gas = $\frac{12}{48} \times 360^{\circ} = 90^{\circ}$

o

Central angle for oil =
$$\frac{6}{48} \times 360^\circ = 45^\circ$$

Ex.10The table shows the way used by 300 students travel to school.

Made of Transport	Bus	Car	Motorbike	Walk
No. of students	100	60	90	50

Draw a pie chart to represent the above data.

Sol. Total number of student = 300

Central angle of a component =
$$\begin{pmatrix} value of the component \\ Sum of the values of all component \\ Sum of the values of all component \\ Sum of the values of all component \\ No. of students \\ Mode No. of students \\ Central angle \\ Bus 100 & \frac{100}{300} \times 360^\circ = 120^\circ \\ Car & 60 & \frac{60}{300} \times 360^\circ = 72^\circ \\ Motorbike 90 & \frac{90}{300} \times 360^\circ = 108^\circ \\ \end{bmatrix}$$

Ex.12Each of the following pie charts gives you a different piece of information about your class. Find the fraction of the circles representing each of these information.



(i) Girls or boys

(ii) Love/Hate Mathematics

Sol. The fraction of circle representing

(i) Number of girls = $\frac{50}{100} = \frac{1}{2}$. Number of boys = $\frac{50}{100} = \frac{1}{2}$.

(ii) The fraction of circle representing Number of students who hate Mathematics = $\frac{15}{100} = \frac{3}{20}$.

Number of students who love Mathematics =
$$\frac{100-15}{100} = \frac{85}{100} = \frac{17}{20}$$

- Ex.13 Answer the following questions based on the pie chart given below :
 - (i) Which type of programmes are viewed the most?
 - (ii) Which two types of programmes have number of viewers equal to those watching sort channels?
- Sol. (i) Entertainment programmes are viewed the most.
 - (ii) News and information channels together (10% + 15% = 25%) have equal number of viewers to watching sports channels.

CHANCE AND PROBABILITY

The word probability is commonly used in our day to day conversation S and we generally use this word even without going into the details of its actual meaning. In our day to day life we come across statement likes :

- (i) There is a chance that it will rain today.
- (ii) Chances are high that the prices of petrol will go up.
- (iii) I doubt that I will get above 90% in my exams this year.
- (iv) Most probably we will go for a picnic next week.

The words chance, doubt, most probably etc. are show the probability of occurrence of an event.

SOME EXPERIMENTS AND THEIR OUTCOMES

(i) Tossing a Coin : Suppose we toss a coin and let it fall flat on the ground. Its upper face will show either Head (H) or Tail (T).

(a) Whatever comes up, is called an outcome. (b) All possible outcomes are Head (H) or Tail (T).

(ii) Throwing a dice : A dice is a solid cube having 6 faces, marked as 1, 2, 3, 4, 5, 6 respectively.

Suppose we throw a dice and let it fall flat on the ground. Its upper face will show one of the numbers 1, 2, 3, 4, 5, 6.

(a) Whatever comes up, is called an outcome.(b) All possible outcomes are 1, 2, 3, 4, 5, 6.The act of tossing a coin or throwing a dice is called an experiment.Whatever comes up, is called an outcome.

SOME TERMS RELATED TO PROBABILITY

Experiment : An activity which has some well defined results is called an experiment, and the results obtained in the experiment are known as outcomes.

Random Experiments : An experiment in which all possible outcomes are known and the exact outcome cannot be predicted in advance, is called a random experiment.



SOLVED EXAMPLES

Ex.1 Find the mean age of 100 residents of a colony from the following data :

Age in years	Number of persons
Greater than 0	100
Greater than 10	90
Greater than 20	75
Greater than 30	50
Greater than 40	25
Greater than 50	15
Greater than 60	5
Greater than 70	0

Sol. Let assumed mean a = 35

Age (in years)	Number of persons	Mid value xi	$u_i = \frac{x_i - 35}{10}$	
0 - 10	10	5	-3	-30
10 - 20	15	15	-2	-30
20 - 30	25	25	-1	-25
30 - 40	25	35	0	0
40 - 50	10	45	1	10
50 - 60	10	55	2	20
60 - 70	5	65	3	15
Total	$\sum f_i = 100$			$\sum f_i u_i = -40$

Here, a = 35, h = 10

$$\overline{\mathbf{x}} = \mathbf{a} + \frac{\Sigma \mathbf{f}_{i} \mathbf{u}_{i}}{\Sigma \mathbf{f}_{i}} \times \mathbf{h}$$

$$\Rightarrow \qquad \overline{x} = 35 + \frac{-40}{100} \times 10 = 31$$

Hence, the mean age = 31 years :

Ex..2 The following distribution show the daily pocket allowance of children of a locality. The mean pocket allowance is Rs. 18.00. Find the missing frequency f.

Class- Interval	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Frequency	7	6	9	13	f	5	4

Ex..4 Calculate the median for the following distribution

Weight (in kg)	Number of sudent
46	3
47	2
48	4
49	6
50	5
51	2
52	1

Sol. The cumulative frequency table is constructed as shown below :

Weights	Number of	Cumulative
×i	students	frequency
	fi	
46	3	3
47	2	5
48	4	9
49	6	15
50	5	20
51	2	22
52	1	23

Here, n = 23, which is odd

Median =
$$\frac{t_{23+1}}{2} = t_1$$

= 49

(i.e. weight of the 12th student when the weights have been arranged in order)

Ex..5 Find the median of the following data :

2

(i) 8, 10, 5, 7, 12, 15, 11 (ii) 12, 14, 10, 7, 15, 16 Sol. (i) 8, 10, 5, 7, 12, 15, 11 These numbers are arranged in an order 5, 7, 8, 10, 11, 12, 15 The number of observations = 7 (odd) \Rightarrow Median = $\frac{7+1}{2}$ = 4th term \Rightarrow Median = 10 (ii) 12, 14, 10, 7, 15, 16 These numbers are arranged in an order 7, 10, 12, 14, 15, 16 The number of observations = 6 (even) The medians will be mean of $\frac{6}{2}$ = 3rd and 4th terms i.e., 12 and 14

Ex.121t is given that a box of 500 electric bulbs contains 14 defective bulbs. One bulb is taken out at random from this box. What is the probability that it is a non-defective bulb?

Sol. Out of 500 electric bulbs one bulb can be chosen in 500 ways.

÷. Total number of outcome = 500

There are (500 - 14 = 486) non-defective bulbs out of which on bulb can be chosen in 486 ways.

Favourable number of outcomes = 486 *.*•.

Hence, P (getting non defective bulb) = $\frac{486}{500} = \frac{243}{250}$.

Ex.13The weights (in kg) of 10 students of a class are : 43.5, 49.5, 52, 43, 47, 44.5, 38.5, 40, 47, 38.

- (i) What is the mean weight?
- (ii) What is the range of the weights of the students?
- (iii) Find the number of students having weight more than the mean weight.

Mean weight = $\frac{\text{Sum of all observations}}{\text{Number of observations}}$ Sol. (i)

$$= \frac{43.5 + 49.5 + 52 + 43 + 47 + 44.5 + 38.5 + 40 + 47 + 38}{10} = \frac{443.0}{10} \text{ kg} = 44.3 \text{ kg}.$$

(ii) Arranging the data in ascending order, i.e., 38, 38.5, 40, 43, 43.5, 44.5, 47, 47, 49.5, 52 The greatest weight is 52 kg and the lowest weight is 38 kg. Therefore, the range is (52-38) kg = 14 kg

(iii) Number of students having weight more than mean weight = 5.

Ex.14The mean of 8 observations was found to be 57. Later on, it was discovered that one observation, i.e. 48 was misread as 84. Find the correct mean.

Sum of all the observation = $57 \times 8 = 456$

Since 48 was misread as 84, therefore, the correct sum of all the observations is = 456 - 84 + 48 = 420

Hence, Correct mean = $\frac{420}{8}$ = 52.5

Ex.15The mean weight of 4 boys is 56 kg and that of 6 girls in 46 kg. Find the combined mean weight of 10 students.

Sol. The total weight of 4 boys = $56 \times 4 = 224$ kg

The total weight of 6 girls = $46 \times 6 = 276$ kg

The total weight of 10 students = (224 + 276) kg = 500 kg

mean weight of a student = $\left(\frac{500}{10}\right)$ kg = 50 kg ÷.

Hence, the mean weight of a students is 50 kg.

Ex.16The mean weight of 10 students is 50 kg. One of the students with weight 55 kg leaves and is replaced by another student of weight 45 kg. Find the new mean weight. Sol.

Total weight of 10 students = $50 \times 10 = 500$ kg

Total weight after the change = (500 - 55 + 45) kg = 490 kg

New mean weight = $\frac{490}{10}$ = 49 kg

Hence, the new mean weight = 49 kg.

Ex.17The mean of 5 observations is \bar{x} . If 4 added to each observation, find the new mean.

Sol. Let the observations be x_1 , x_2 , x_3 , x_4 and x_5 having mean as x.

$$\therefore \quad \bar{x} = \frac{x_1 + x_2 + x_3 + x_4 + x_5}{5} \Rightarrow x_1 + x_2 + x_3 + x_4 + x_5 = 5\bar{x}$$



Ex.20The frequency distribution of weights (in kg) of 40 persons of a locality is given below :

Weight (in kg)	40-45	45-50	50-55	55-60	60-65
No. of persons	4	12	13	6	5

- (i) What is the upper limit of first class interval?
- (ii) Find the class marks of the second class interval.
- (iii) What is the class size of each class? (iv) Which class interval has the highest frequency?
- (v) What is the lower limit of the last class interval?
- Sol. (i) Upper limit of the first class interval (40-45) is 45.
 - (ii) Class mark of the second class interval (45-50) is $\frac{45+50}{2} = \frac{95}{2} = 47.5$
 - (iii) Class size of each class is 5.
 - (iv) Class (50-55) has the highest frequency (13).
 - (v) Lower limit of the last class interval (60-65) is 60.

Ex.21 The following table shows the export earnings of India (in thousand crore rupees) during five consecutive years.

Year	2001-02	2002-03	2003-04	2004-05	2005-06
Export (in throusand crore rupees)	130	142	160	204	156

Draw a bar graph representing the above data.

Sol. We can draw the bar graph by following these steps :

Step-I : On a graph paper, draw a horizontal line OX and a vertical line OY, representing the x-axis and the y-axis respectively.

Step-II : Along OX, mark the years at points taken at equal gaps.

Step-III : Choose the scale : 1 small division \equiv 2 thousand crore rupees. Step-IV : Then the heights of the bars are :

Export in 2001 – 2002 =
$$\left(\frac{1}{2} \times 130\right)$$
 = 65 small divisions

Export in 2002 – 2003 =
$$\left(\frac{1}{2} \times 142\right)$$
 = 71 small divisions

Export in 2003 – 2004 = $\left(\frac{1}{2} \times 160\right)$ = 80 small divisions

Export in 2004 – 2005 =
$$\left(\frac{1}{2} \times 204\right)$$
 = 102 small divisions

Export in 2005 – 2006 = $\left(\frac{1}{2} \times 156\right)$ = 78 small divisions

- Sol. (i) It is clear from the bar graph that the bar of minimum height corresponds to the sale on Friday.
 - ... The sale was minimum on Friday.
 - (ii) From the bar graph, we find that the bar of maximum height corresponds to the sale on Monday.
 ∴ The sale was maximum on Monday.
 - (iii) The total sale during the week = (225 + 100 + 150 + 200 + 75 + 100) bulbs = 850 bulbs.
 - (iv) The minimum sale during the week = 75 bulbs.The maximum sale during the week = 225 bulbs.
 - \therefore Minimum sale : maximum sale = 75 : 225 = 1 : 3.
- Ex.23The mid values of a distribution are 54, 64, 74, 84, and 94. Find the class interval and class limits.
- Sol. The class interval is the difference of two consecutive class marks, therefore class interval

$$(h) = 64 - 54 = 10.$$

Here the mid values are given and the class interval is 10. So class limits are.

For 1 st class	$54 - \frac{10}{2}$ to $54 + \frac{10}{2}$ or 49 to 59
For 2 nd class	$64 - \frac{10}{2}$ to $64 + \frac{10}{2}$ or 59 to 69
For 3 rd class	$74 - \frac{10}{2}$ to $74 + \frac{10}{2}$ or 69 to 79
For 4 th class	$84 - \frac{10}{2}$ to $84 + \frac{10}{2}$ or 79 to 89
For 5 th class	$94 - \frac{10}{2}$ to $94 + \frac{10}{2}$ or 89 to 99

Therefore class limits are 49–59, 59–69, 69–79, 79–89 and 89–99.

Ex.24The figure shows the histogram for the frequency distribution of marks of 21 students in a History Test. (out of 100)



Study the histogram and answer the following questions :

- (i) How many students got the maximum marks?
- (ii) What does the longest rectangle depict?
- (iii) What is the class size?
- (iv) How many students got marks between 80 and 90?

Ex.26Draw a histogram to represent the following data :

Classs interval	20-25	25-30	30-35	35-40	40-45
Frequency	6	8	11	14	7

Sol. We represent the class-intervals along the horizontal axis on a suitable scale and the frequencies along the vertical axis on a suitable scale.

1 large division = 2 units.

Height for the interval $20 - 25 = \frac{6}{2} = 3$ large division Height for the interval $25 - 30 = \frac{8}{2} = 4$ large division Height for the interval $30 - 35 = \frac{11}{2} = 5.5$ large division Height for the interval $35 - 40 = \frac{14}{2} = 7$ large division Height for the interval $40 - 45 = \frac{7}{2} = 3.5$ large division





DATA HANDLING	Page # 27				
Q.22 Find the sum of the deviations of the variate values 3, 4, 6, 8, 14 from their mean.	Q.35 Find the mean of the following distribution :				
Q.23 The mean of 40 observations was 160. It was detected on rechecking that the value of 165 was	f : 5 10 10 7 8				
wrongly copied as 125 for computation of mean. Find the correct mean.	Q.36 Find the mean of the following distribution : x : 10 30 50 70 89				
Q.24 The mean of 10 numbers is 20. If 5 is subtracted from every number, what will be the	f: 7 8 10 15 10 0.27 Find the value of p if the mean of following				
new mean ?	distribution is 7.5.				
Q.25 The mean of 16 numbers is 8. If 2 is added to every number, what will be the new mean ?	x: 3 5 7 9 11 13 y: 6 8 15 p 8 4				
Q.26 If $x_{1'}, x_{2'}, \dots, x_n$ are n values of a variable X	Q.38 Find the missing frequencies in the following				
such that $\sum_{i=1}^{n} (x_i - 2) = 110$ and $\sum_{i=1}^{n} (x_i - 5) = 20$.	frequency distribution if it is known that the mean of the distribution is 1.46.				
Find the value of n and the mean.					
Q.27 Neeta and her four friends secured 65, 78, 82, 94 and 71 marks in a test of mathematics. Find the average (arithmetic mean) of their marks.	Number of accidents (x) :012345Total				
Q.28 The marks obtained by 10 students in physics out of 40 are 24, 27, 29, 34, 32, 19, 26, 35, 18, 21. Compute the mean of the marks.	Frequency (f):46??25105200Q.39 If the mean of the following data be 9.2, find				
Q.29 The mean of 20 observations was found to be 47. But later it was discovered that one observation 66 was wrongly taken as 86. Find the correct mean.	the value of p. x 4 6 7 p+4 12 12 f 5 6 4 10 8 7				
Q.30A car owner buys petrol at Rs. 20.00, Rs. 24.00 and Rs. 25.00 per litre for three successive	Q.40 The marks of 30 students are given below, find the mean marks.				
years. Compute the average cost per litre of petrol when he spends Rs. 12000 on petrol each year.	Marks Number of Students				
Q.31 Find the mean of the following numbers : 12, 14, 17, 25, 10, 11, 20, 8, 15, and 18,					
Q.32The mean of 5, 7, p, 11, 15, 17, and 20 is	12 8 13 6				
Q.33 If \overline{x} denote the mean of $x_1, x_2,, x_n$, show	14 7 15 2				
that	Q.41Calculate the mean for the following				
$\sum_{i=1}^{N} = (x_i - \overline{x})$	distribution :				
Q.34 If the mean of 5 observations is 15 and that of another 10 observations is 20, find the mean of	Variable 5 6 7 8 9 Frequency 4 8 14 11 3				
all 15 observations					

Q.53 The adjoining pie chart depicts the games played by the students of a school. Each students plays only one game. Examine this graph and answer the following questions.

- (i) Which game is liked least?
- (ii) Which two games are liked equally?

(iii) If there are 1500 students in the school, how many students played tennis?



(iv) What percentage of students play badminton ?

(v) Find the ratio of the students who play tennis to those who play cricket ?

Q.54 Pie charts drawn fig., depicts the number of students of classes VII to X of a school. Read it and answer the following questions, if there are 720 students in these four classes.

(i) How many students are in class X?

(ii) How many students are more class VIII than in class VIII?



(iii) Find the ratio of the students of class IX to that of class X.

Q.55 The adjoining pie chart gives the marks scored in an examination by a student in Hindi, English, Mathematics, Social Science and Science. If the total marks obtained by the students were 540, answer the following questions.
(i) In which subject did the student score 105 marks?
(Hint : For 540 marks, the central angle = 360°. So,

for 105 marks, what is the central angle?) (ii) How many more marks were obtained by the student in Mathematics than in Hindi?



(iii) Examine whether the sum of the marks obtained in

Social Science and Mathematics is more than that in Science and Hindi. (Hint : Just study the central angles.)

Q.56 A survey was made to find the type of music that a certain group of young people likes in a city.Adjoining pie chart shows the findings of this survey.From this pie chart answer the following questions :



(i) If 20 people like classical music, how many young people were surveyed?

(ii) Which type of music is liked by the maximum number of people?

(iii) If a cassette company were to make 1000 CD's, how many of each type would it make?

Q.57 Given below is the result of an annual examination of a class, showing the percentage of students in each category.

First	Second	Third	Failed
Division	Division	Division	
25%	45%	20%	10%

Represent the above data by pie chart.