S. A. Jaipuria College. Delhi

Problem Set - I

Topic: Graphical Representation of data.

1. The following numbers give the weights of 55 students of a class. Prepare a suitable frequency table:

42	74	40	60	82	115	41	61	75	83	63
53	76	84	56	67	110	65	78	77	56	75
68	69	80	79	95	104	73	54	59	81	100
66	49	77	90	84	76	42	64	69	70	80
72	50	79	52	103	96	51	86	78	94	71

i) Draw the histogram and frequency polygon of the above data. From the histogram obtain an approximate value of mode.

ii) From the above weights, prepare a cumulative frequency table and draw the less than type ogive. Hence obtain an approximate value of median.

2. Use a suitable diagram to present the following data relating to the trade deficit during different plans of India (taken from economic survey, 1989-90 & 1991-92):

Plan Period	Second	third	fourth	fifth	sixth	seventh
Trade Credit (Rs. Crores)	2340	2380	1560	3180	28100	54200

3. Draw a suitable diagram for average per capita consumption of cereals per month in rural and urban India, 1989-90. (Consumption in kg. per month in India)

	Rice	Wheat	Jowar	Bajra	Maize
Rural	6.93	4.70	0.95	0.56	0.52
Urban	5.45	4.84	0.42	0.19	0.15

(Source: Sarvekshana, 52nd issue, July-Sept. 1992)

4. The actual outlay on the public sector in the seventh and eighth five year plans of India is shown below by head of development:

Head of development	Seventh Plan outlay (Rs. Crores)	Eighth plan outlay (Rs. crore)
Agricultural and allied service	30317	32025
Irrigation and flood control	16719	23771
Industries and minerals	30052	46889
Transport and communications	38804	80798
Energy	63615	1,22,356
Services	39576	84088
Miscellaneous	3186	44173
Total	222169	434106

Draw suitable diagrams to show the relative importance attached to the various heads in each plan. Hence make a comparison between the seventh and the eighth plan.

5. Express diagrammatically the following data on per 1000 distribution of employment status of people in India by their broad categories during 1989-90:

Employment Status	Rural		Urban	
	Male	Female	Male	Female
Employed	961	708	977	826
Unemployed	11	9	7	8
Not in labour force	28	283	16	166.

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Problem Set - II

Topic: Measure of central tendency

1. Given below is the distribution of 140 candidates obtaining marks X or higher in a certain examination (all marks are given in whole number):

X	:	10	20	30	40	50	60	70	80	90	100
more than c.f.	:	140	133	118	110	75	45	25	9	2	0

Calculate the mean median and mode of the distribution.

2. The following table gives the frequency distribution of marks in a class of 65 students.

Marks:	0 - 4	4 - 8	8 - 12	12 - 14	14 - 18	18 - 20	20 - 25
No of Students:	10	12	18	7	5	3	10

Calculate: i) Mean, Median, Mode ii) Upper and lower quartiles

iii) Draw the ogives. iv) Number of students who secured marks more than 17. v) Number of students who secured marks between 10 and 15.

3. For a certain frequency table with total frequency 150. the mean was found to be Rs. 576.47. But while copying out the table, a typist left out two of the class frequencies, say f^* and f^{**}, so that the table is given to you in the following form:

Weekly wages in Rs. (mid value)	565	570	575	580	585	590	595
Frequency	5	48	f^*	30	f^{**}	8	6

Determine f^* and f^{**}.

4. You are given the following incomplete frequency distribution:

Wages (in Rs)	300-324	325-349	350-374	375-399	400-424	425-449
Frequency	5	17	80	?	325	?

Wages (in Rs.)	450-474	475-499
Frequency	88	9

It is known that the total frequency is 1000 and the median is 413.13. Estimate the missing frequencies and mode.

5. A man reached his destination by car in two days, travelling outward 8 hours on the first day at 50 km/h. and 8 hrs also on the second day at 40 km/h. For the return journey he chooses an easier path and a 20 km. shorter route and covers 350 km. on the first day with a 7 hrs run and 350 km on the second day but with only 5 hrs run. Compare the average speeds in outward and inward journeys and calculate the overall average speed for the entire journey on Km. per hour bases.

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Problem Set-III

Topic: Measures of dispersion: with moments Skewness and Kurtosis:

1. Compute quartile deviation graphically for the following data:

Marks:	20-30	30-40	40-50	50-60	60-70	70-
Number of Students	5	20	14	10	8	5

2. Age distribution of hundred life insurance policy holders is as follows:

Age as on nearest bday	17-19.5	20-25.5	26-35.5	36-40.5	41-50.5	51-55.5	56-60.5
Number	9	16	12	26	14	12	6

3. For the following data, calculate i) Semi-inter quartile range ii) coefficient of variation iii) β_1 and β_2 coefficient

Wages in Rupees:	170-180	180-190	190-200	200-210	210-220	220-230	230-240
Number of persons:	52	68	85	92	100	95	70

4. Find the second, third and fourth central moments of a frequency distribution given below. Hence find and measure of Skewness (γ_1) and measure of kurtosis (γ_2)

Class boundary	110-115	115-120	120-125	125-130	130-135	135-140	140-145
Frequency	5	15	20	35	10	10	5

Also apply Sheppard's corrections for moments.

5. Obtain Karl Pearson's measure of Skewness for the following data:

Values	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	6	8	17	21	15	11	2

6. Assume that a firm has selected a random sample of 100 from its production line and has obtain the data shown in the table below:

Class interval	130-134	135-139	140-144	145-149	150-154	155-159	160-16
Frequency	3	12	21	28	19	12	5

compute the following:

i) Arithmetic mean ii) standard deviation iii) Karl Pearson's coeff. of Skewness.

7. For the frequency distribution given below, calculate the coefficient of Skewness based on quartiles.

Monthly sales (in lakh)	Less than 20	<30	<40	<50	<60	<70	<80	<90	<100
No of firms	30	225	465	580	634	644	650	665	680

8. Karl Pearson's Coefficient of Skewness of a distribution is 0.32 its s.d. is 6.5 and mean 29.6. Find the mode of the distribution.

9. In a frequency distribution, the coefficient of skewness based upon the quartiles is 0.6. If the sum of the upper and lower quartiles is 100 and median is 38, find the value of the upper and lower quartiles.

13. a) A frequency distribution gave the following results:

i) C.V. = 5 ii) Karl Pearson's coefficient of Skewness = 0.5

iii) $\sigma = 2$

b) Find the mean and mode of the distribution

Find the C.V of a frequency distribution given that its mean is 120, mode is 123 and Karl Pearson's coefficient of Skewness is -0.3.

11. the scores in English of 250 candidates appearing at an examination have mean = 39.72, $m_2 = 97.80$, $m_3 = -114.18$ and $m_4 = 28,396.14$. It is later found on scrutiny that the score 61 of a candidate has been wrongly recorded as 51. Make necessary corrections in the given values of mean and central moments.

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Problem Set - (IV)

Topic: Problems based on combined mean and variance

1. A group of 100 items has mean 60 and variance 25. If the mean of the first 50 items is 61 and standard deviation is 4.5, find the mean and standard deviation of the other 50 items.

2. The means of two samples of size 50 and 100 respectively are 54.1 and 50.3 and the standard deviations are 8 and 7. Obtain the mean and standard deviation of the sample of size 150 obtained by combining two samples.

3. A distribution consists of three components with frequencies 200, 250 and 300 having means 25, 10 and 15 and standard deviations 3, 4 and 5 respectively. Show that the mean of the combined group is 16 and its standard deviation is 7.2 approximately.

4. Find the missing information from the following data:

	Group I	Group II	Group III	Combined
Number	50	?	90	200
Standard deviation	6	7	?	7.746
Mean	113	?	115	116

5. An analysis of monthly wages paid to the workers of two firms A and B belonging to the same industry gives the following results:

	Firm A	Firm B
Number of workers	500	600
Average daily wages	186.00	175.00
Variance of distribution of wages	81	100

i) Which firm has a larger wage bill?

ii) In which firm is there greater variability in individual wages?