Measure of Central Tendency
Exercise

1. Calculate the mean for the following frequency distribution for n=100

Class interval	Frequency
0-10	10
10-20	20
20-30	40
30-40	20
40-50	10

Answer: 25

2. The following data represent the distribution of the ages of employees within two different divisions of publishing company. Determine which company have relatively aged group of employees.

Age of employees	Number of employees of division	
	X	Y
0-10	6	13
10-20	19	30
20-30	9	24
30-40	10	0
40-50	2	4

Answer: Division X; (Mean X: 21.3043; Mean Y: 18.24)

3. The frequency distribution below represents the weights in pounds of a sample of packages carried last month by a small airfreight company.

Class	Frequency	Class	Frequency
10.0 – 11.0	1	15.0 – 16.0	11
11.0 – 12.0	4	16.0 – 17.0	8
12.0 – 13.0	6	17.0 – 18.0	7
13.0 – 14.0	8	18.0 – 19.0	6
14.0 – 15.0	12	19.0 – 20.0	2

Find the mean, median and mode.

Answer: Mean: 15.2077; Median: 15.1364; Mode: 14.8

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4. Suppose that 100 students are enrolled in a statistics class and the following are the test scores received by them:

77	**44**	**49**	**33**	**38**	**76**	**68**	**68**	**39**	**44**
29	**41**	**32**	**45**	**83**	**58**	**73**	**47**	**40**	**26**
34	**47**	**66**	**53**	**55**	**58**	**49**	**45**	**61**	**41**
54	**50**	**51**	**66**	**80**	**73**	**57**	**61**	**56**	**50**
38	**45**	**51**	**44**	**41**	**68**	**45**	**92**	**43**	**12**
59	**36**	**55**	**47**	**61**	**53**	**32**	**65**	**51**	**33**
59	**55**	**43**	**66**	**44**	**41**	**25**	**39**	**72**	**37**
55	**92**	**83**	**77**	**45**	**62**	**45**	**36**	**78**	**48**
45	**82**	**71**	**48**	**46**	**69**	**38**	**72**	**56**	**64**
37	**16**	**44**	**57**	**63**	**71**	**40**	**64**	**57**	**51**

i. Organize the data in classes such as 10 – 20, 20 – 30 and so on

ii. Using the above data draw histogram, frequency polygon, ogive and stem leaf plot.

iii. Find the mean median and mode for the given data.

Answer: Mean: 53.2; Median: 51.36; Mode: 47

5. The following data set represents the record high temperatures in degree Fahrenheit (°F) for each of the 50 US states:

112	**100**	**117**	**106**	**114**	**118**	**105**	**110**	**109**	**112**
110	**118**	**117**	**116**	**118**	**112**	**114**	**114**	**105**	**109**
116	**112**	**114**	**115**	**118**	**117**	**118**	**92**	**106**	**110**
88	**108**	**110**	**121**	**113**	**120**	**119**	**111**	**104**	**111**
107	**113**	**98**	**117**	**105**	**110**	**118**	**112**	**114**	**114**

i. Construct a suitable frequency distribution table using interval 85 – 95, 95 – 105 and so on.

ii. Determine the modal temperature.

iii. Determine the proportion of states having temperature that is more than modal temperature.

Answer: ii. Mode (FD table): 111.6667; iii. 0.58 (Mode: 111.67)

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6. The data given represent the ages of patients admitted to a small hospital on February 28, 2018.

85	**75**	**66**	**43**	**40**	**41**	**88**	**80**
56	**56**	**67**	**69**	**89**	**83**	**65**	**53**
75	**74**	**87**	**83**	**52**	**44**	**48**	**49**

i. Construct a frequency distribution table.

ii. Compute the sample mean median and mode from the frequency distribution table.

iii. Compute the sample mean, median and mode from the raw data.

Answer: ii. Mean: 65.4167; Median: 65; Mode: 84
iii. Mean: 65.33; Mode: 56, 75, 83; Median: 66.5

7. The rate of return for 30 stocks is:

8.3	**9.6**	**9.5**	**9.1**	**8.8**	**11.2**	**7.7**	**10.1**	**9.9**	**10.8**
10.2	**8.0**	**8.4**	**8.1**	**11.6**	**9.6**	**8.8**	**8.0**	**10.4**	**9.8**
9.2	**6.5**	**8.9**	**7.4**	**12.5**	**13.8**	**8.6**	**11.2**	**10.5**	**11.2**

Organize this information into a stem-leaf display. Hence answer the following

a. How many rates are less than 9.0?

b. Determine the mode.

c. Determine median.

d. What are the maximum and the minimum rates of return?

[a.12; b. 11.2; c. 9.55; d. 6.5, 13.8]

8. 168 handloom factories have the following distribution of average number of workers in various income groups:

Income Groups:	800 - 1000	1000 - 1200	1200 – 1400	1400 – 1600	1600 – 1800
Number of firms:	40	32	26	28	42
Average Number of Workers:	8	12	8	8	4

Find the mean salary paid to the workers.

Answer: 1228.84

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9. A class of 50 students sits for a class test. The following table gives result of the students who passed the examination:

Marks:	40	50	60	70	80	90
Number of Students:	8	10	9	6	4	3

If the mean marks for all the students were 51.6, find out the mean marks of the students who failed.

Answer: 21Marks

10. The average declared by a group of 10 chemical companies was 18 percent. Later on it was discovered that one correct figure, 12 was misread as 22. Find the correct average dividend.

Answer: 17 percent

11. A company wants to pay bonus to members of the staff. The following "Table 1" demonstrates the amount to be paid as bonus and" table 2" represents the actual amount of salary drawn by the employees of that company:

Table 1: Monthly Bonus Policy

Monthly salary (in tk.)	Bonus
3000 – 4000	1000
4000 – 5000	1200
5000 – 6000	1400
6000 – 7000	1600
7000 – 8000	1800
8000 – 9000	2200
9000 – 10000	2300
10000 - 11000	2400

Table 2: Monthly Salary

3250	*3780*	*4200*	*4550*	*6600*
6200	*6800*	*7250*	*3630*	*8320*
9420	*9520*	*8000*	*10020*	*10280*
11000	*6100*	*6250*	*7630*	*3820*
5400	*4630*	*5780*	*7230*	*6900*

For the given information determine –

i. How much would the company need to pay by way of bonus?

ii. What shall be the average bonus paid per member of the staff?

Answer: tk. 41600 and tk. 1664

12. The mean of 200 observations was 50. Later on, it was found that two observations were misread as 92 and 8 instead of 192 and 88. Find the correct mean.

Answer: 50.9

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13. There are two units of a garment in two different cities employing 760 and 800 persons, respectively. The arithmetic means of monthly salaries paid to persons in these two units are tk 18750 and tk. 16950 respectively. Find the combined arithmetic mean of salaries of the employees in both the units.

Answer: tk. 17827 (appx.)

14. An investor buys Tk. 12000 worth of shares of a company each month. During the first 5 months he bought the shares at a price of tk. 100, tk. 120, tk. 150, Tk. 200 and tk. 240 per share respectively. After 5 months what is the average price paid for the shares by the investor.

Answer: tk. 146.34 (appx.)

15. A charitable organization decided to give Old-age pension to people over sixty years of age. The scales of pension were fixed as follows (*see* Table 1) and the ages of persons who secured the pension are given in table 2:

Table 1: Pension policy

Age Group	Pension /Month
60 – 65	200
65 – 70	250
70 – 75	300
75 – 80	350
80 - 85	400

Table 2: Actual salary drawn by employees

74	76	60	83	67
71	84	68	74	81
75	61	61	66	79
62	69	67	72	64
63	72	78	64	73

Determine –

i. How much money would the organization need to pay by way of pension?

ii. What shall be the average pension payable person and the standard deviation?

Answer: $\bar{x} = tk.282$ ***and*** $\sigma = tk.69.04$

16. In 2014, a person spends tk. 1800 monthly on an average for the first four months and tk. 2000 monthly for the next eight months and saves tk. 5600 in that a year. Determine the person's average monthly income.

[Total income 28800 Tk., Average income 2400 Tk.]

17. The average of 11 results is 60. If the average of first 6 results is 58 and that of the last six is 63, find the sixth result.

[66]

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Weighted Mean

18. The US postal service handles seven basic types of letters and cards: 3rd class, 2nd class, 1st class, airmail, special delivery, registered and certified. The mail volume during 2004 is given in the following table

Types of mailing	gm delivered (in millions)	Price per gm
1st class	77600	0.13
AIR mail	19000	0.17
Special delivery	1300	0.35
Registered mail	750	0.40
Certified mail	800	0.45

What was the average revenue per gm for these services during the year?

[0.145per gm]

19. WESTECS sold 95 Executive Men's Suits for the regular price of TK. 4,900. For the summer sale the suits were reduced to Tk. 3,500 and 126 were sold. At the final year end clearance, the price was further reduced to Tk. 2,500 and the remaining 79 suits were sold.

i. What was the weighted mean price of a WESTECS suit?

ii. WESTECS paid Tk. 2000 a suit for the 300 suits. Comment on the store's profit per suit if a salesperson received a Tk. 150 for each one sold.

[i) 3680Tk. ii) Profit 1530Tk. for each suit]

Quartile

20. For the following data compute the three quartiles.

99	75	84	33	45	66	97	69	55	61
72	91	74	93	54	76	62	91	77	68

[Q_1=61.5; Q_2=73; Q_3=87.5]