Ravi Maths Tuition

Statistics

11th Standard

Mathematics

Multiple Choice Question 29 x 1 = 29

1) Standard deviation of a data is given by _____.

(a) $\sigma = \sqrt{\frac{1}{N}\sum fd^2 - \left(\frac{1}{N}\sum fd\right)^2}$ (b) $\sigma = \sqrt{\left(\frac{1}{N}\sum fd\right)^2 - \frac{1}{N}\sum fd^2}$ (c) $\sigma = \sqrt{\frac{1}{N}\sum fd^2 - \frac{1}{N}\sum fd^2}$

(d) None of these

2) If ↘is the variance and o is the S.D. then _____.

(a) $\searrow = \frac{1}{\sigma^2}$ (b) ↘ = σ^2 (c) $\sigma = \frac{1}{\searrow}$ (d) $\sigma = \frac{1}{\searrow^2}$

3) The mean deviation of the series a, a + d, a + 2d, ... a + nd from its mean is _____.

(a) $\frac{(n+1)d}{(n+2)}$ (b) $\frac{nd}{2n+1}$ (c) $\frac{n(n+1)d}{2n+1}$ (d) $\frac{(2n+1)d}{n}$

4) If the S. D. of a set of observation is 8 and if each observation is divided by- 2 then S.D. of new set of observation is _____.

(a) -4 (b) 4 (c) 8 (d) -8

5) The number which indicates variability of data or observations, is called _____.

(a) measure of central tendency (b) mean (c) median (d) measure of dispersion

6) Which of the following is/are true about the range of the data?
I. It helps to find the variability in the observations on the basis of maximum and minimum value of observations.
II. Range of series =Minimum value - Maximum value.
III. It tells us about the dispersion of the data
from a measure of central tendency.

(a) Only I is true (b) II and III are true (c) I and II are true (d) All are true

7) Mean deviation about the median for the data 3,9,5,3,12,10,18,4,7,19,21 is _____.

(a) 4.27 (b) 5.24 (c) 5.27 (d) 4.24

8) The mean deviation from the mean of the set of observations -1, 0 and 4 is _____.

(a) 3 (b) 1 (c) -2 (d) 2

9) For the arithmetic progression a, (a + d), (a + 2d), (a + 3d), ... , (a + 2nd), the mean deviation from mean is _____.

(a) $\frac{n(n+1)d}{2n-1}$ (b) $\frac{n(n+1)d}{2n+1}$ (c) $\frac{n(n-1)d}{2n+1}$ (d) $\frac{(n+1)d}{2}$

10) The quantity which leads to a proper measure of dispersion, is _____.

(a) $\sum (x_i - \bar{x})^2$ (b) $\frac{1}{n}\sum (x_i - \bar{x})$ (c) $\frac{1}{n}\sum (x_i - \bar{x})^2$ (d) $\sum (x_i - \bar{x})$

11) The mean and variance for the data 6, 7, 10, 12, 13, 4, 8, 12 respectively are _____.

(a) 9,9.50 (b) 8,8.50 (c) 9,9.25 (d) 8,8.25

12) The variance of the following data

xi	6	10	14	18	24	28	30
fi	2	4	7	12	8	4	3

(a) 41.5 (b) 40.6 (c) 43.4 (d) 45.2

13) Find the variance of the following data

Class interval	4 -8	8-12	12-16	16-20
Frequency	3	6	4	7

(a) 13 (b) 18 (c) 19 (d) 20

14) Variance of the data 2, 4, 5, 6, 8, 17 is 23.33. Then, variance of 4, 8, 10, 12, 16, 34 will be _____.

(a) 23.33 (b) 25.33 (c) 46.66 (d) 48.66

15) The measure of variability which is independent of units, is called _____.

(a) mean deviation (b) variance (c) standard deviation (d) coefficient of variation

16) If the coefficient of variation is 45% and the mean is 12,then its standard deviation is _____.

(a) 5.2 (b) 5.3 (c) 5.4 (d) None of these

17) The sum of the squares of deviations for 10 observations taken from their mean 50 is 250. Then, the coefficient of variation is _____.

(a) 10% (b) 40% (c) 50% (d) None of these

18) The variance of the numbers 2, 3, 11 and x is $\frac{49}{4}$ Find the value of x.

(a) $6, \frac{14}{3}$ (b) $6, \frac{14}{5}$ (c) $6, \frac{16}{3}$ (d) None of these

19) Two formulae for the standard deviation (σ) $\sqrt{\frac{\Sigma(x_i-\bar{x})^2}{n}}$ and $\sqrt{\frac{\Sigma x_i^2}{n}-\bar{x}^2}$ of ungrouped data are ...K.... Here, K refers to _____.

(a) proportional (b) different (c) equivalent (d) dependent

20) Which of the following is/ are used for the measures of dispersion?

(a) Range (b) Quartile deviation (c) Standard deviation (d) All of these

21) Mean deviation about median for continuous frequency distribution is calculated by using the formula _____.

(a) $\mathrm{MD}(M)=\frac{1}{N}\sum_{i=1}^{n} f_i\,|x_i+M|$ (b) $\mathrm{MD}(M)=\frac{1}{N}\sum_{i=1}^{n} f_i\,|x_i-M|$ (c) $\mathrm{MD}(M)=\frac{1}{N}\sum_{i=1}^{n} \frac{f_i}{|x_i-M|}$

(d) $\mathrm{MD}(M)=\frac{1}{N}\sum_{i=1}^{n} \frac{|x_i-M|}{f_i}$

22) The mean deviation about the mean of the set of first n natural numbers when n is an even number is _____.

(a) $\frac{n}{2}$ (b) $\frac{n}{4}$ (c) $\frac{n}{6}$ (d) $\frac{n}{8}$

23) If x_1, x_2,x_3,x_4 and x_5 be the observations with mean m and standard deviation s then. the standard deviation of the observations kx_1, kx_2, kx_3, kx_4, and kx_5 is _____.

(a) k + s (b) $\frac{s}{k}$ (c) ks (d) s

24) The standard deviation for the following data is

xi	3	8	13	18	23
fi	7	10	15	10	6

(a) 6.21 (b) 6.31 (c) 6.12 (d) 6.13

25) Consider the following data 57.64.43.67.49.59.44.47.61.59 Match the following measures of data in Column I with their corresponding values in
Column II and choose the correct option from the codes given below.

Column I	Column II
A. Mean of the data	66.2
B. Variance of the data	8.13
C. Standard deviation of the data	55

(a) 3 2 1 (b) 3 1 2 (c) 2 3 1 (d) 2 1 3

26) Consider the following data 1.2.3.4.5.6.7.8.9.10 If 1is added to each number. then variance of the numbers so obtained is _____.

(a) 6.5 (b) 2.87 (c) 3.87 (d) 8.25

27) The coefficient of variation (CV) is defined as where. σ and $\bar{x}$ are the standard deviation and mean of the data.

(a) $\mathrm{CV} = \frac{\bar{x}}{\sigma} \times 100$ (b) $\mathrm{CV} = \frac{\sigma^2}{\bar{x}} \times 100$ (c) $\mathrm{CV} = \frac{(\sigma)^{1/2}}{\bar{x}} \times 100$ (d) $\mathrm{CV} = \frac{\sigma}{\bar{x}} \times 100$

28) If n = 10. $\bar{x}$ = 12 and Σx_i^2 = 1530. then the coefficient of variation is _____.

(a) 35% (b) 42% (c) 30% (d) 25%

29) If the mean deviation of numbers, 1.1+ d.1 + 2d,...,1+ 100d from their mean is 255. then d is equal to _____.

(a) 10.0 (b) 20.0 (c) 10.1 (d) 20.2

2 Marks 89 x 2 = 178

30) Given that $\bar{x}$ is the mean and σ^2 is the variance of n observations,$x_1 + x_2 + x_3 + \ldots + x_n$ then prove that the mean and variance of the observations $ax_1, ax_2, \ldots, ax_n$ are a $\bar{x}$ and $a^2\sigma^2$, respectively (where,$a \neq 0$)

31) The mean and standard deviation of six observations are 8 and 4, respectively. If each observation is multiplied by 3, find the new mean and new standard deviation of the resulting observations.

32) The mean and standard deviation of a group of 100 observations were found to be 20 and 3, respectively. Later on it was found that three observations were incorrect, which were recorded as 21, 21 and 18. Find the mean and standard deviation if the incorrect observations are omitted.

33) The mean and variance of 7 observations are 8 and 16, respectively. If five of the observations are 2,4,10,12 and 14, then find remaining two observations.

34) The diameters of circles (in mm) drawn in a design are given below:

Diameter(in mm)	33-36	37-40	41-44	45-48	49-52
Number of circles	15	17	21	22	25

Calculate the standard deviation and mean diameter of the circles.
[Hint First make the data continuous by making the classes as 32.5-36.5, 36.5-40.5, 40.5-44.5, 44.5 - 48.5, 48.5 - 52.5 and then proceed.]

35) Find the mean deviation about the mean for the data :
4,7,8,9,10,12,13,17

36) Find the mean deviation about the mean for the data :
38, 70, 48, 40, 42, 55, 63, 46, 54, 44

37) Find the mean deviation about the mean for the data

x_i	5	10	15	20	25
f_i	7	4	6	3	5

38) Find the mean deviation about the mean for the data

x_i	10	30	50	70	90
f_i	4	24	28	16	8

39) Find the mean deviation about the median for the data

x_i	5	7	9	10	12	15
f_i	8	6	2	2	2	6

40) Find the mean deviation about the median for the data

x_i	15	21	27	30	35
f_i	3	5	6	7	8

41) Find the mean and variance for each of the data : 6, 7, 10, 12, 13, 4, 8, 12

42) Find the mean and variance for each of the data :
First n natural numbers

43) Find the mean and variance for each of the data :
First 10 multiples of 3

44) Find the mean and standard deviation using short cut method.

x_i	60	61	62	63	64	65	66	67	68
f_i	2	1	12	29	25	12	10	4	5

45) Find the mean and variance for the following frequency distribution in

Class	0-30	30-60	60-90	90-120	120-150	150-180	180-210
Frequencies	2	3	5	10	3	5	2

46) Find the mean and variance for the following frequency distribution in

Classes	0-10	10-20	20-30	30-40	40-50
Frequencies	5	8	15	16	6

47) Find the variance and standard deviation for the following data, 6,7,10,12,13,4,8,12.

48) Find the mean deviation about the mean for the following data

$\mathbf{x_i}$	2	5	6	8	10	12
$\mathbf{f_i}$	2	8	10	7	8	5

49) Let a,b,c,d and e be the observations with mean m and standard deviation S.Then , find the standard deviation of the observations a+k,d+k,c+k,d+k,e+k.

50) Let $x_1, x_2, x_3 + x_4 \text{and} x_5$ be the observations with mean m and standard deviation S. Then, find the standard deviation S. Then, find the standard deviation of the observation $kx_1, kx_2, kx_3, kx_4 \; and \; kx_5$

51) Find the variance and standard deviation for the following data.
45,60,62,50,65,58,68,44,48

52) Find the mean deviation about the mean for the following data.
38,70,48,40,42,55,63,46,54,44

53) Find the mean deviation from the median of the following frequency distribution

Age (in Years)	10	12	15	18	21	23
Frequency	3	5	4	10	8	4

54) Find the mean deviation from the mean for the following data 6.5,5,5.25,5.5,4.75,4.5,6.25,7.75,8.5

55) Two plants A and B of a factory show following results about the number of workers and the wages paid to them.

	A	B
Number of workers	4000	4500
Average monthly wages	3000	3000
Variance of distribution	16	25

Which plant, A or B shows greater variability in individual wages?

56) Find the standard deviation and the variance of first n natural numbers.

57) Find the mean deviation from the median for the following data.

x_i	15	21	27	30	35
f_i	3	5	6	7	8

58) The standard deviation of some temperature data (in^0C) is 5. Find the variance, if the data were converted into^0F

59) An analysis of monthly wages paid to the workers in two firms A and B belonging to the same industry give the following results.

	A	B
Number of workers	500	600
Average monthly wages	Rs.186	Rs.175
Variance of distribution of wages	81	100

Calculate the variability of individual wages.

60) Find the mean deviation about the median for the data 34,66,30,38,44,50,40,60,42,51.

61) Find the variance and standard deviation of the following data.

x_i	4	8	11	17	20	24	32	1
f_i	3	5	9	5	4	3	1	

62) Following are the marks obtained out of 100, by two students Ravi and Shiva in 10 tests

Ravi	25	50	45	30	70	42	36	48	35	60
Shiva	10	70	50	20	95	55	42	60	48	80

Who is intelligent and who is more consistent?

63) The mean of 6,8,5,7, a, and 4 is 7. Find the mean deviation about the median of this observation.

64) Find the mean deviation from the median of the following frequency distribution.

Age (in years)	10	11	12	13	14	15	16
Frequency	3	8	14	19	7	6	3

65) Find the variance and standard deviation for the following distribution using shortcut method.

x_i	60	61	62	63	64	65	66	67	68
f_i	2	1	12	29	25	12	10	4	5

66) The mean and Sd Of 100 items was recorded as 40 and 5.1 respectively. later on it was discovered that one observation 40 was wrongly copied down as 50.Find the correct

67) The marks obtained by 7 students are 8,9,11 ,13,14,15,21.Find the variance and standard deviation of these marks.

68) Find the mean deviation about the mean for the following data.

Marks obtained	10 - 20	23 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
Number of students	2	3	8	14	8	3	2

69) Calculate the mean deviation about the mean of the set of first n natural numbers when n is an even number.

70) The following is the record of goals scored by team A in a football session.

Number of goals scored	0	1	2	3	4
Number of matches	1	9	7	5	3

For the team B, mean number of goals scored per match 2 with standard deviation 1.25 goals. Find which team may be considered more consistent?

71) Find the mean deviation about the median of the following frequency distribution.

Class	0-6	6-12	12-18	18-24	24-30
Frequency	8	10	12	9	5

72) Find the mean, variance and standard deviation of the following data.

73) If $\bar{x}$ is mean and $MD(\bar{x})$ is the mean deviation from mean then find the number of observations lying between $\bar{x} - MD(\bar{x})$ and $\bar{x} + MD(\bar{x})$. Use the data 22,24,30,27,29,31,25,28,41,42.

74) Calculate the mean deviation about median for the following data.

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	6	7	15	16	4	2

75) Calculate the variance and standard deviation for the following distribution.

Class	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	2

76) There are 60 students in a class. the following is the frequency distribution of the marks.

Marks	0	1	2	3	4	5
Frequency	X-2	x	X^2	$(X+1)^0$	2x	x+1

Where x is a positive integer. Determine the mean and standard deviation of the marks.

77) If each of the observation x_1, x_2 ,....,x is increased by a where a is negative or positive number, then show that the variance remains unchanged

78) Calculate the mean deviation about median for the age distribution of 100 persons given below.

Age	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55
Number	5	6	12	14	26	12	16	9

First, make the class intervals are of uniform length and then use the following formula.

$$Median\,(M) = l + \frac{\frac{N}{2} - cf}{f} \times h \quad and \quad MD\,(M) = \frac{\Sigma fi|x_i - M|}{\Sigma fi}$$

79) Two plants A and B of a factory show results about the number of workers and wages paid to them.

	A	B
Number of workers	5000	6000
Average monthly wages	2500	2500
Variance of distribution of wages	81	100

Which plants A or B is the greater variability in individual wages?

80) Find the mean deviation from the mean of the following data by shortcut or step deviation method.

Class	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800
Frequency	4	8	9	10	7	5	4	3

81) Coefficient of variations of two distributions are 50 and 60 and their arithmetic means are 30 and 25, respectively. Find the difference of their standard deviations.

82) Calculate the mean and standard deviation of the following cumulative data.

Wages (in Rs)	0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
Number of workers	12	30	65	107	157	202	222	230

83) Find the variance of the data 6,5,9,13,12,8 and 10.

84) Find the standard deviation of first 10 natural numbers

85) The mean of 100 observation is 50 and their standard deviation is 5.Find the sum of all squares of all the observations.

86) The mean and standard deviation of some data for the time taken to complete a test are calculated with the following results. Number of observation =25, mean=18.2s , standard deviation=3.25 s. Further, another set of 15 observation=3.25 s .Further, another set of 15 Observations,$x_1, x_2, \ldots . x_{15}$ also in seconds is now available and we have$\sum_{i=1}^{15} x_i = 279$ and $\sum_{i=1}^{15} x_1^2 = 5524$ Calculate the standard derivation based on all 40 observation

87) The following relates to sample of size 60,$\sum x^2 = 18000$ and $\sum x = 960,$ find the variance.

88) Goals scored by two teams A and B in a football session were as follows

Number of goals scored in match	Number of matches	
	Team A	Team B
0	24	25
1	9	9
2	8	6
3	5	5
4	4	5

Which team is more consistent?

89) An analysis of monthly wages paid to workers in two firms A and B belonging to the same industry, give the following result.

	Firm A	**Firm B**
Number of wages earners	586	648
Mean of monthly wages	Rs. 5253	Rs. 5253
Variance of distribution of wages	100	121

Which firm A or B pays out larger amount as monthly wages?

90) An analysis of monthly wages paid to workers in two firms A and B belonging to the same industry, give the following result.

	Firm A	**Firm B**
Number of wages earners	586	648
Mean of monthly wages	Rs. 5253	Rs. 5253
Variance of distribution of wages	100	121

Which firm A or B, shows greater variability in individual wages?

91) An analysis of monthly wages paid to workers in two firms A and B belonging to the same industry, give the following result.

	Firm A	**Firm B**
Number of wages earners	586	648
Mean of monthly wages	Rs. 5253	Rs. 5253
Variance of distribution of wages	100	121

Which value is addressed by the firms by paying out larger wages to employees?

92) From the following data, state which group is more variable A or B?

Marks	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Group A	9	17	32	33	40	10	9
Group B	10	20	30	25	43	15	7

For more variable, we have to find coefficient of variation i.e $CV = \frac{\sigma}{\overline{x}} \times 100$. The group having higher coefficient of variations will be more variable.

93) A school conducted an intelligence test for the students and the winner of the test was to be awarded with a cash prize of Rs. 5000.

The scores of 48 children in an intelligence test are shown in the following frequency table.

Score	**Frequency**	**Score**	**Frequency**
71	4	97	4
76	3	101	3
79	4	103	3
83	5	107	3
86	6	110	2
89	5	114	2
90	4		

Calculate the variance σ^2 and find out the percentage of children, whose scores lies between $\overline{x} - \sigma$ and $\overline{x} + \sigma$.

94) A school conducted an intelligence test for the students and the winner of the test was to be awarded with a cash prize of Rs. 5000.
The scores of 48 children in an intelligence test are shown in the following frequency table.

Score	Frequency	Score	Frequency
71	4	97	4
76	3	101	3
79	4	103	3
83	5	107	3
86	6	110	2
89	5	114	2
90	4		

What value is shown in this question?

95) In a survey of 44 villages of a state, about the use of LGP as a cooking mode, the following information about the families using LPG was obtained.

Number of families	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Number of villages	6	8	16	8	4	2

Find the mean deviation about median for the following data.

96) In a survey of 44 villages of a state, about the use of LGP as a cooking mode, the following information about the families using LPG was obtained.

Number of families	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Number of villages	6	8	16	8	4	2

Do you think more awareness was needed for the villagers to use LPG as a mode of cooking?

97) Find the mean deviation about the mean for the following data.
6, 7, 10, 12, 13,4,8,20

98) Find the mean deviation about the median for the following data.
22,24,30,27,29,31,25,28,41,42

99) Calculate mean deviation about mean from the following data

x_i	3	9	17	23	27
f_i	8	10	12	9	5

100) Find the mean deviation about the mean for the following data
36,72,46,60,45,42,53,49,51,46

101) Find the mean deviation about the median for the following data
34,66,44,30,38,50,42,51,40,60

102) Find the mean deviation about the mean for the following data

x_i	5	7	9	10	12	15
f_i	8	6	2	2	2	6

103) Find the mean deviation about the median for the following data

x_i	10	15	20	25	30	35	40	45
f_i	7	3	8	5	6	8	4	9

104) Find the mean deviation about the mean for the following data

Marks obtained	10-20	20-30	30-40	40-50	50--60	60-70	70-80
Number of Students	2	3	8	14	8	3	2

105) Find the mean deviation about the median for the following data

Class	0-6	6-12	12-18	18-24	24-30
Frequency	8	10	12	9	5

106) Find the variance and standard deviation of
3, 4, 6, 5, 5, 3, 8, 1, 7, 5

107) Find the mean, variance and standard deviation of the following data: 62, 65, 57, 56, 69, 51, 62, 60

108) Find the mean, variance and standard deviation of the following data: 15, 22, 27, 14, 9, 9, 11, 21

109) Find the mean, variance and standard deviation of the following data:

x_i	3.5	4.5	5.5	6.5	7.5	8.5	9.5
f_i	3	7	22	60	85	32	8

110) Calculate the mean, variance and standard deviation of the following data:

classes	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Frequencies	3	51	122	141	130	51	2

111) The coefficient of variation of two distribution are 55% and 70% and their standard deviations are 20 and 18 respectively. What are their arithmetic means?

112) Suppose that samples balloons from two manufacturers A and B are tested by a trader for bursting pressure as follows;

Bursting pressure	Number of balloons manufactured by	
	A	B
5-10	2	9
10-15	9	11
15-20	29	18
20-25	54	32
25-30	11	27
30-35	5	13

Which balloons have the highest average bursting pressure?

113) The following are some particulars of the distribution of weights of boys and girls in a class:

	Boys	Girls
Number	100	50
Mean Weight	60kg	45kg
Variance	9	4

Which of the distributions is more variable?

114) The analysis of daily wages paid to workers in two firms A and B belonging to the same industry are:

	firm A	Firm B
Number of workers	812	910
Daily wages	80	92
Variance	16	25

(i) Which firm A or B pays more in total daily wages?

(ii) Which A or B shows greater variability in wages?

115) Find the mean deviation about the mean of the following data:

Classes	5-6	6-7	7-8	8-9	9-10	10-11
Frequencies	8	20	12	6	3	1

116) The variance of20observations is 5. If each observation is increased by 5, find the new variance.

117) The mean and S.D. of 100 students of a class in the subjects English, Maths and Science are given below

SUBJECT	**ENGLISH**	**MATHS**	**SCIENCE**
Mean	51	60	45
S.D	12	15	9

Which of the three subjects is more consistent and which is more variable?

118) Find the variance of the following data:

CLASSES	0-10	10-20	20-30	30-40	40-50
FREQUENCIES	15	20	22	27	6

3 Marks 42 x 3 = 126

119) Find the mean deviation about the mean for the following data:

6, 7, 10, 12, 13, 4, 8, 12

120) Find the mean deviation about the mean for the following data :
12, 3, 18, 17, 4, 9, 17, 19, 20, 15, 8, 17, 2, 3, 16, 11, 3, 1, 0, 5

121) Find the mean deviation about the median for the following data:
3, 9, 5, 3, 12, 10, 18, 4, 7, 19, 21.

122) Find mean deviation about the mean for the following data :

x_i	2	5	6	8	10	12
f_i	2	8	10	7	8	5

123) Find the mean deviation about the median for the following data:

x_i	3	6	9	12	13	15	21	22
f_i	3	4	5	2	4	5	4	3

124) Find the mean deviation about the mean for the following data.

Marks obtained	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of students	2	3	8	14	8	3	2

125) Calculate the mean deviation about median for the following data :

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	6	7	15	16	4	2

126) Find the variance of the following data:
6, 8, 10, 12, 14, 16, 18, 20, 22, 24

127) Find the variance and standard deviation for the following data:

$\mathbf{x_i}$	4	8	11	17	20	24	32
$\mathbf{f_i}$	3	5	9	5	4	3	1

128) Calculate the mean, variance and standard deviation for the following distribution :

Class	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	2

129) Find the standard deviation for the following data :

xi	3	8	13	18	23
fi	7	10	15	10	6

130) Calculate mean, variance and standard deviation for the following distribution.

Class	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	2

131) The variance of 20 observations is 5. If each observation is multiplied by 2, find the new variance of the resulting observations.

132) The mean of 5 observations is 4.4 and their variance is 8.24. If three of the observations are 1, 2 and 6, find the other two observations.

133) If each of the observation x_1, x_2, ...,xn is increased by 'a', where a is a negative or positive number, show that the variance remains unchanged.

134) The mean and standard deviation of 100 observations were calculated as 40 and 5.1, respectively by a student who took by mistake 50 instead of 40 for one observation. What are the correct mean and standard deviation?

135) Find the mean deviation from the mean for the following data
6, 5, 5.25, 5.5, 4.75, 4.5, 6.25, 7.75, 9.

136) The scores of a batsman in 10 innings are 48, 80, 58, 44, 52, 65, 73, 56, 64, 54. Find the mean deviation from the median.

137) The frequency distribution

x	A	2A	3A	4A	5A	6A
f	2	1	1	1	1	1

Where, A is a positive integer, has a variance of 160. Determine the value of A.

138) Find the mean deviation about the median for the following data.

x_i	3	6	9	12	13	15	21	22
f_i	3	4	5	2	4	5	4	3

139) Find the mean deviation from the median for the following data.

$\mathbf{x_i}$	15	21	27	30	35
$\mathbf{f_i}$	3	5	6	7	8

140) Find the mean and standard deviation for the following data.

class interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	2	4	6	5	5	5	2	8	5

141) Calculate mean deviation (from median) for the following data.

Marks	0-10	10-20	20-30	30-40	40-50
Number of students	5	8	15	16	6

142) Calculate the mean deviation from the mean of the following distribution.

Marks	0-10	10-20	20-30	30-40	40-50
Numbers of students	5	8	15	16	6

143) Find the mean and standard deviation of the following frequency distribution

x_i	6	10	14	18	24	28	30
f_i	2	4	7	12	8	4	3

144) Calculate the mean deviation from the median for the following data.

Wages Per day	Number of workers
20-30	3
30-40	8
40-50	12
50-60	9
60-70	8

145) Find the standard deviation for the following data.

x_i	3	8	13	18	23
f_i	7	10	15	10	6

146) Find the mean and standard deviation for the following data.

Age(in years)	**Number of teachers**
25-30	30
30-35	23
35-40	20
40-45	14
45-50	10
50-55	3

147) Find the mean deviation about the mean for the following data.

Marks Obtained	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of Students	2	3	8	14	8	3	2

148) Find the variance and standard deviation for the following distribution.

x_i	4.5	14.5	24.5	34.5	44.5	54.5	64.5
f_i	1	5	12	22	17	9	4

149) Find the mean, variance and standard deviation for the following

$\mathbf{x_i}$	4	8	11	17	20	24	32
$\mathbf{f_i}$	3	5	9	5	4	3	1

150) Calculate mean and variance of the given data.

$\mathbf{x_i}$	2	4	6	8	10	12	14	16
$\mathbf{f_i}$	4	4	5	15	8	5	4	5

151) Calculate the mean and variance of the following data.

$\mathbf{x_i}$	0	1	2	3	4	5	6	7	8	9	10	11	12
$\mathbf{f_i}$	51	203	383	525	532	408	273	139	43	27	10	4	2

152) Calculate the mean, variance and standard deviation for the following distribution.

Class	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45
Frequency	20	24	32	28	20	11	26	15	24

153) The following table shows the marks obtained by 100 candidates in an examination.Calculate the mean and standard deviation.

Marks	1-10	11-20	21-30	31-40	41-50	51-60
Number of Candidates	3	16	26	31	16	8

154) Find the standard deviation and variance of the following data.

$\mathbf{x_i}$	140	145	150	155	160	165	170	175
$\mathbf{f_i}$	4	6	15	30	36	24	8	2

155) Calculate the mean, variance and standard deviation for the following distribution.

Class	0-30	30-60	60-90	90-120	120-150	150-180	180-210
Frequency(f)	2	3	5	10	3	5	2

156) Calculate the mean deviation from the median of the following data

Wages per week in Rs	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of workers	4	6	10	20	10	6	4

157) Find the variance and standard deviation for the following data:
65, 68, 58, 44, 48, 45, 60, 62, 60, 50

158) Two plants A and B of a factory show following results about the number of workers and the wages paid to them

	A	B
Number of workers	5000	6000
Average monthly wages	2500	2500
Variance of distribution of wages	81	100

In which plant, A or B is there greater variability in individual wages?

159) Coefficient of variation of two distributions are 60 and 70, and their standard deviations are 21 and 16, respectively. What are their arithmetic means.

160) The following values are calculated in respect of heights and weights of the students of a section of Class XI :

	Height	Weight
Mean	162.6 cm	52.36 kg
Variance	127.69 cm^2	23.1361 kg^2

Can we say that the weights show greater variation than the heights?

Case Study Questions 2 x 4 = 8

161) The marks of students of class XI in Maths test (out of 20) are given below:

Marks (x_i)	5	7	9	11	13	15	17
Number of students (f_i)	2	4	6	8	10	12	8

On the basis of above information, answer the following questions.

(i) Total number of students in the class is

(a) 20 (b) 30 (c) 40 (d) 50

(ii) Cumulative frequency corresponding to mark 11 is

(a) 10 (b) 20 (c) 22 (d) 28

(iii) Median (M) of given data is

(a) 11 (b) 13 (c) 15 (d) None of these

(iv) The value of $\sum_{i=1}^{n} f_i \left|x_i - M\right|$ is

(a) 116 (b) 126 (c) 136 (d) 146

(v) The value of mean deviation from median of given data is

(a) 2.72 (b) 2.70 (c) 2.68 (d) 2.66

162) Let x_i and y_i are two data such that $y_i = ax_i + b$. If $\bar{x}, \bar{y}$ are mean and σ_x, σ_y are standard deviation of the given data x, and y, respectively. Then, we have $\vec{y} = a\vec{x} + b$ and $a_y = |a|\sigma_y$

On the basis of above information, answer th. following question.

(i) If $y_t = 4x_i - 3$ and x^2 is 10 , then y=

(a) 40 (b) 7 (c) 37 (d) 43

(ii) If $y_i = \frac{ax_i+b}{c}$, then $\sigma_y =$

(a) $\frac{a\sigma_x+b}{c}$ **(b)** $\frac{a}{c}\sigma$ **(c)** $\left|\frac{a}{c}\right|\sigma_x$ **(d) None of these**

(iii) If $y_i = x_i + 10$, then

(a) $\sigma_y = \sigma_x + 10$ **(b)** $\sigma_y = \sigma_x$ **(c)** $\sigma_y = \sigma_x - 10$ **(d) None of thes**

(iv) If $x_i = 3y_i + 2$, then

(a) $\bar{y} = \bar{x}$ **(b)** $\bar{y} = 3\vec{r} + 2$ **(c)** $\bar{y} = \bar{x} - 2$ **(d) None of these**

(v) If $y_i = ax_i + b$, then

(a) $\text{var}(Y) = a^2\,\text{var}(X)$ **(b)** $\text{var}(X) = a^2\,\text{var}(Y)$ **(c)** $\text{var}(Y) = \text{var}(X) + b$ **(d) None of these**

5 Marks 22 x 5 = 110

163) Find the mean deviation about the median for the data
13,17,16,14,11,13,10,16,11,18,12,17

164) Find the mean deviation about the median for the data :
36, 72, 46, 42, 60, 45, 53, 46, 51, 49

165) Find the mean deviation about the mean for the data

Income per day	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800
Number of persons	4	8	9	10	7	5	4	3

166) Find the mean deviation about the mean for the data

Height in cm	95-105	105-115	115-125	125-135	135-145	145-155
Number of boys	9	13	26	30	12	10

167) Find the mean deviation about median for the following data:

Marks	0-10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Number of Girls	6	8	14	16	4	2

168) Calculate the mean deviation about median age for the age distribution of 100 persons gives below:

Age	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55
Number	5	6	12	14	26	12	16	9

[Hint Convert the given data into continuous frequency distribution by subtracting 0.5 from the lower limit and adding 0.5 to the upper limit of each class interval]

169) Find the mean and variance for each of the data :

x_i	6	10	14	18	24	28	30
f_i	2	4	7	12	8	4	3

170) Find the mean and variance for each of the data :

x_i	92	93	97	98	102	104	109
f_i	3	2	3	2	6	3	3

171) Find the mean, varience and standard deviation using short-cut method

Height in cm	70-75	75-80	80-85	85-90	90-95	95-100	100-105	105-110	110-115
No. of children	3	4	7	7	15	9	6	6	3

172) The mean and variance of eight observations are 9 and 9.25 respectively. If six of the observations are 6, 7, 10, 12, 12 and 13, find the remaining two observations.

173) The mean and standard deviation of 20 observation are found to be 10 and 2 respectively. On rechecking, it was found that an observation 8 was incorrect. Calculate the correct mean and standard deviation in each of the following cases:
(i) If wrong item is omitted
(ii) If it is replaced by 12.

174) An original frequency table with mean 11 and variance 9.9 was lost but the following table derived from it was found.Construct the original table.

Value of deviation(d)	-2	-1	0	1	2
Frequency (f)	1	6	7	4	2

175) The runs of two players for 10 innings each are as follows.

A	58	59	60	54	65	66	52	75	69	52
B	94	26	92	65	96	78	14	34	98	13

Whom may be regarded as more consistent player?

176) The mean and variance of eight observations are 9 and 9.25, respectively. If six of the observations are 6,7,10,12,12 and 13, then find the remaining two observations.

177) Find the variance and standard deviation of the following frequency distribution

x_i	2	4	6	8	10	12	14	16
f_i	4	4	5	15	8	5	4	5

178) Find the mean and standard deviation of the following distribution:

Marks	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Number of students	3	6	13	15	14	5	4

179) The marks obtained (out of 100) by two students A and B in 10 qualifying tests were:

A:	48	53	58	41	54	52	54	49	51	50
B:	11	98	60	94	48	52	17	90	20	20

who is more consistent in performance and who is more variable?

180) Find the C.V of the following data:

Size (in m)	10-15	15-20	20-25	25-30	30-35	35-40
No.of items	2	8	20	35	20	15

181) From the data given below state which group is more variable, A or B?

Marks	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Group A	9	17	32	33	40	10	9
Group B	10	20	30	25	43	15	7

182) From the prices of shares X and Y below, find out which is more stable in value:

X	35	54	52	53	56	58	52	50	51	49
Y	108	107	105	105	106	107	104	103	104	101

183) The sum and sum of squares corresponding to length x (in cm) and weight y (in gm) of 50 plant products are given below:
$\sum_{i=1}^{50} x_i = 212, \sum_{i=1}^{50} x_i^2 = 902.8, \sum_{i=1}^{50} y_i = 261, \sum_{i=1}^{50} y_i^2 = 1457.6$
which is more varying, the length or weight?

184) The mean and standard deviation of marks obtained by 50 students of a class in three subjects, Mathematics, physics and chemistry are given below:

Subject	Mathematics	Physics	Chemistry
Mean	42	32	40.9
Standard deviation	12	15	20

Which of the three subjects shows the highest variability in marks and which shows the lowest?

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