MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

MEASURES OF DISPERSION

Solved Examples

1. If the range of a discreter date of n observation on is zero, then

    A. all values of date are zero

    B. all values of data are equal to standard deviation

    C. all value of date are equal

D. the extreme values of data are different

Answer: C

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2. The first of two samples has 100 items with mean 15 and standard deviation 3. If the whole group has 250 items with mean 15.6 and standrd deviation $\sqrt{13.44}$ then standard deviation of second group is

A. 4

B. 3

C. 6

D. 2

Answer: A

3. If the median and mode of 4 observations are 4,6 and the sum of square of the observation is 48, then standard deviations is

A. $\sqrt{2}$

B. 4

C. 0

D. $\sqrt{5}$

Answer: C

4. Consider any set of 201 observation $x_1, x_2, \ldots \ldots \ldots, x_{200}, x_{201}$. It is given that $x_1 < x_2 < \ldots \ldots < x_{200} < x_{201}$. Then the mean deviation of this set of observations about a point k is minimum which k equals.

A. $\dfrac{x_1 + x_2 + \ldots \ldots \ldots + x_{200} + x_{201}}{201}$

B. x_1

C. x_{101}

D. x_{201}

Answer: C

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5. If a is a non - zero interger and b is a postive number such $ab^2 = \log_{10} b$, the mediam of the set $\left\{ 0, 1, a, b, \dfrac{1}{b} \right\}$ is

A. 1

B. all values of data are equal to standard deviation

C. b

D. $\dfrac{1}{b}$

Answer: C

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Exercise 1

1. The simplest measure of dispersion is

A. Standard deviation

B. Range

C. Mean deviation

D. Quartile deviation

Answer: B

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2. If the greatest and least values of a data are 95, 10 then range=

A. 10

B. 5

C. 85

D. 12

Answer: C

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3. In a grouped data, the difference between the last upper

bound and first lower bound is called

A. Range

B. Standard deviation

C. Variance

D. None

Answer: A

4. The range of the series of values 25, 15, 32, 17, 45, 37 is

A. 20

B. 30

C. 15

D. 25

Answer: B

5. Which of the following is used in finding mean deviation ?

A. Arithmetic mean

B. Median

C. Mode

D. All the three

Answer: D

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6. The mean deviation of first 3 natural number is

A. 1

B. $2/3$

C. $1/5$

D. $4/5$

Answer: B

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7. Mean deviation of first three odd numbers is

A. 3

B. 1

C. 2

D. $4/3$

Answer: D

8. Mean deviation of -1, 0, 4 is

A. 2

B. 3

C. $4/3$

D. $3/2$

Answer: A

9. Mean deviation of first 5 natural numbers through mean

is

A. 3

B. 1.2

C. $5/6$

D. 6

Answer: B

10. The mean deviation of 3, 6, 10, 4, 9, 10 about the mean is

A. 2.33

B. 2.67

C. 3.33

D. 3.65

Answer: B

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11. The mean deviation of 6, 7, 10, 12, 13, 4, 12, 16 about the mean is

A. 2.35

B. 3.25

C. 5.23

D. 5.32

Answer: B

12. Mean deviation of 3, 5, 7, 9, 11, 13 is

A. 3

B. 5

C. 9

D. 11

Answer: A

13. Mean deviation of 7, 10, 15, 10, 8, 8, 7, 3, 2, 10 through

mean is

A. 2.6

B. 8

C. $4/5$

D. None

Answer: A

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14. The mean deviation of 4, 7, 8, 9, 10, 12, 13, 17 about mean is

A. 2

B. 3

C. 4

D. 3.5

Answer: B

15. Find the mean deviation about the mean for the following data

38,70,48,40,42,55,63,46,54,44

A. 7

B. 8

C. 8.2

D. 8.4

Answer: D

16. Find the mean deviation about the median for the following data

4,6,9,3,10,13,2

A. 3.2

B. 2.3

C. 3.29

D. 2.39

Answer: C

17. Mean deviation of the scores 1, 1, 2, 2, 3, 3,3, 4, 4 from their median is

A. 0

B. 0.9

C. 0.09

D. 9

Answer: B

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18. Find the mean deviation 6, 7, 10, 12, 13, 4, 12, 16 about the median is

A. 3.25

B. 4.25

C. 5.25

D. 2.35

Answer: A

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19. The mean deviation of 13, 17, 16, 11, 13, 10, 16, 11, 18, 12, 17 about median is

A. 2

B. 2.25

C. 2.45

D. 3.25

Answer: C

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20. Mean deviation of 390, 400, 400, 410, 410, 420, 420, 430, 430, 440, 440, 450 through median is

A. 420

B. 15

C. 7/2

D. None

Answer: B

21. Mean deviation 26, 32, 20, 18, 25, 24, 22, 25, 27, 28, 25 through mode is

A. 25

B. 2.5

C. 2.63

D. None

Answer: C

22. If $\Sigma f_i = 100, \Sigma f_i x_i = 220, \Sigma f_i(x_i - \bar{x}) = 104.8$ then

mean deviation =

A. 2.2

B. 1.048

C. 104.8

D. 220

Answer: B

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23. If the sum of deviation of values from an average is 125

and mean deviation is 8.33, then the number of terms is

A. 10

B. 15

C. 9

D. 12

Answer: B

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24. The mean deviation about mean for the following data is

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

A. 16

B. 50

C. 40

D. 30

Answer: A

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25. Find the mean deviation about the mean for the data :

x_i	2	5	7	8	10	35
f_i	6	8	10	6	8	2

A. 3.5

B. 2.5

C. 4.5

D. 5.5

Answer: A

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26. The mean deviation about median for the following data

is

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

A. 3

B. 3.2

C. 3.3

D. 3.23

Answer: D

27. The mean deviation about the mean for the data is

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

A. 4

B. 9

C. 4.9

D. 9.44

Answer: D

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28. The mean deviation about mean for the following data is

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

A. 10

B. 15

C. 12

D. 5

Answer: A

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29. The mean deviation about median for the following data is

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

A. 10.34

B. 10.43

C. 10.78

D. 10.87

Answer: A

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30. The mean deviation about the median for the following data is

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	5	8	7	12	28	20	10	10

A. 13.57

B. 14.29

C. 15.18

D. 17.23

Answer: B

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31. If the average of the first n numbers in the sequence 148, 146, 144,....., is 125, then n =

A. 18

B. 24

C. 30

D. 36

Answer: B

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32. The average of the squares of deviation of the values from arithmetic mean is called

A. Range

B. Variance

C. Standard deviation

D. Mean deviation

Answer: B

33. If the Variance of a data is 12.96, then standard deviation is

A. 3.6

B. 36

C. 0.36

D. None

Answer: A

34. Variance of 6, 8, 10 is

A. $\dfrac{3}{8}$

B. $4/3$

C. $8/3$

D. $3/4$

Answer: C

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35. Standard deviation of first three consecutive integers is

A. $2/3$

B. 0

C. $\sqrt{2/3}$

D. 1

Answer: C

36. Standard deviation of 3, 4, 5 is

A. $2/3$

B. $\sqrt{2/3}$

C. $\sqrt{3/2}$

D. $\sqrt{12}$

Answer: B

37. Standard deviation of 3, 5, 7 is

A. $2/3$

B. $\sqrt{2/3}$

C. $\sqrt{3/2}$

D. $2\sqrt{2/3}$

Answer: D

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38. Standard deviation of -1, 0, 4 is

A. $\sqrt{10/3}$

B. $\sqrt{8/3}$

C. $\sqrt{14/3}$

D. $\sqrt{13/3}$

Answer: C

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39. Standard deviation of 1, 0, 2, 3, 4 is

A. $\sqrt{2}$

B. $\sqrt{10}$

C. $\sqrt{3}$

D. $\sqrt{14}/5$

Answer: A

40. Variance of 5, 8, 11, 9, 8, 19 is

A. 19.33

B. 4.4

C. 10

D. None

Answer: B

41. The variance of 6, 7, 10, 12, 13, 4, 8, 12 is

A. 9.25

B. 8.75

C. 8.25

D. 9.75

Answer: A

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42. The variance of the first 50 even natural numbers is

A. 437

B. $\dfrac{437}{4}$

C. $\dfrac{833}{4}$

D. 833

Answer: D

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43. Standard deviation of 3, 5, 7, 9, 11, 13 is

A. 12

B. 11

C. 11.66

D. 3.4

Answer: D

44. The standard deviation of 5, 12, 3, 18, 6, 8, 2, 10 is

A. 4.75

B. 4.95

C. 5.25

D. 5.45

Answer: B

45. Standard deviation of 27, 35, 40, 35, 36, 29 is

A. 17.14

B. 4.14

C. 34

D. None

Answer: B

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46. Standard deviation of first 'n' natural numbers is

A. $\dfrac{\sqrt{n-1}}{nm}$

B. $\dfrac{\sqrt{n^2+1}}{12}$

C. $\dfrac{\sqrt{n^2-1}}{12}$

D. None

Answer: C

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47. The standard deviation of a, a+d, a + 2d,....a + 2nd is

A. nd

B. $n^2 d$

C. $\dfrac{\sqrt{n(n+1)}}{3} d$

D. $\dfrac{\sqrt{n(n+3)}}{3} d$

Answer: C

48. If the median of the data 6, 7, x-2, x, 18, 21 written in ascending order is 16, then the variance of that data is

A. $30\dfrac{1}{5}$

B. $31\dfrac{1}{3}$

C. $32\dfrac{1}{2}$

D. $33\dfrac{1}{3}$

Answer: B

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49. The variance of the following data is

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

A. 43.4

B. 34.3

C. 44.3

D. 33.4

Answer: A

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50. The variance of the following data is

x_i	4	81	11	72	0	24	32
f_i	3	5	9	5	4	3	1

A. 48.5

B. 45.8

C. 54.8

D. 58.4

Answer: B

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51. The standard deviation of the following data is

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

A. 11.48

B. 14.18

C. 11.84

D. 18.14

Answer: B

52. The mean and variance of seven observations are 8 and 16 respectively. If five of the observations are 2 ,4, 10, 12, 14, then the remaining two observations are

A. 2, 3

B. 3, 5

C. 4, 6

D. 6, 8

Answer: D

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

A. 4, 9

B. 5, 8

C. 3, 7

D. 2, 6

Answer: C

54. The arithmetic mean of the observations 10, 8, 5, a, b is 6

and their variance is 6.8. Then ab=

A. 6

B. 4

C. 3

D. 12

Answer: D

55. The variance of 20 observations is 5. If each observations

is multiplied by 2, then the new variance of the resulting

observations is

A. 10

B. 15

C. 20

D. 5

Answer: C

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56. The mean of four observations is 3. If the sum of the squares of these observations is 48 then their standard deviation is

A. $\sqrt{2}$

B. $\sqrt{3}$

C. $\sqrt{5}$

D. $\sqrt{7}$

Answer: B

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57. If $x_1, x_2, \ldots . x_n$ are n observations such that

$\Sigma x_i^2 = 400$ and $\Sigma x_i = 80$ then the least value of n is

A. 12

B. 15

C. 16

D. 18

Answer: C

58. In 100 numbers, 80 numbers are 4's and the rest are 9's

then the standard deviation=

A. 2.1

B. 2.2

C. 2

D. None

Answer: C

59. If the standard deviation of the number 2, 3, a and 11 is 3.5, then which of the following is true?

A. $3a^2 - 26a + 55 = 0$

B. $3a^2 - 32a + 84 = 0$

C. $3a^2 - 34a + 91 = 0$

D. $3a^2 - 23a + 44 = 0$

Answer: B

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60. The mean of the data set comprising of 16 observations is 16. If one of the observation valued 16 is deleted and three

new observations valued 3, 4 and 5 are added to the data, then the mean of the resultant data, is

A. 16.8

B. 16

C. 15.8

D. 14

Answer: D

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61. The mean and standard deviation of 100 observations were calculated as 40 and 5.1, respectivey by a student who

took by mistake 50 instead of 40 for one observations. The correct standard deviation is

A. 5

B. 4

C. 6

D. 10

Answer: A

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62. The arithmetic mean and standard deviation of a set of 9 items are 43 and 5 respectively. If an item of value 63 is

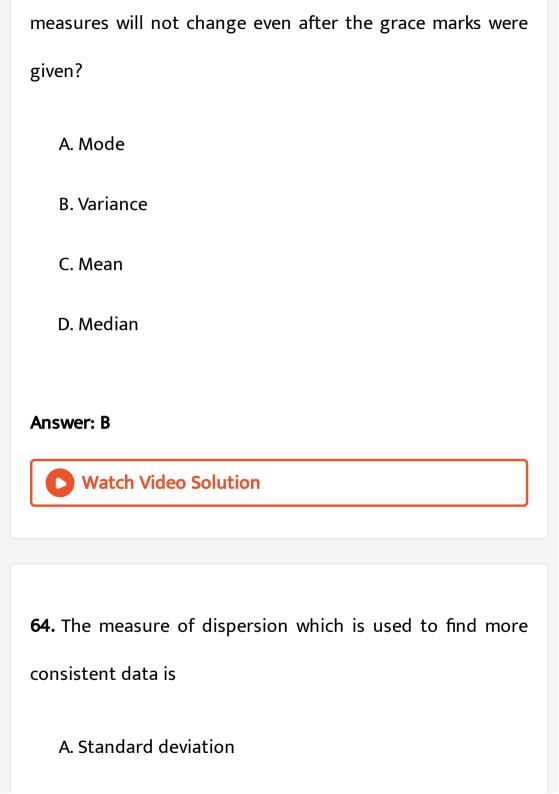added to that set, then the new standard deviation of 10 item set given is

A. 7.5

B. 7.65

C. 6.65

D. 6.7

Answer: B

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63. All the student of a class performed poorly in Mathematics. The teacher decided to give grace marks of 10 to each of the student. Which of the following statistical

measures will not change even after the grace marks were given?

A. Mode

B. Variance

C. Mean

D. Median

Answer: B

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64. The measure of dispersion which is used to find more consistent data is

A. Standard deviation

B. Mean deviation

C. Quartile deviation

D. Range

Answer: A

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65. Two teams A and B have the same mean and their coefficients of variance are 4, 2 respectively. If σ_A, σ_B are the standard deviations of teams A, B respectively then the relation between item is

A. $\sigma_A = \sigma_B$

B. $\sigma_B = 2\sigma_A$

C. $\sigma_A = 2\sigma_B$

D. $\sigma_B = 4\sigma_A$

Answer: C

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66. If standard deviation of a data is 3, arithmetic mean is 20, then coefficient of variation is

A. 15

B. $3/20$

C. $20/3$

D. None

Answer: A

67. If the mean of 10 observations is 50 and the sum of the squares of the deviations of the observations from the mean is 250, then the coefficient of variation of those observations is

A. 25

B. 50

C. 10

D. 5

Answer: C

68. 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	$Rs.2500$	$Rs.2500$
Variance of distribution of wages	81	100

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

A. A

B. B

C. None

D. can not be determined

Answer: B

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

	Firm A	Firm B
No. of wage earners	586	648
Mean of monthly wages	$Rs.5253$	$Rs.5253$
Variance of the distribution of wages	100	121

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

A. A

B. B

C. None

D. can not be determined

Answer: B

70. In a data the number I is repeated I times for i=1, 2, ...,n.

Then the mean of the data is

A. $\dfrac{2n + 1}{6}$

B. $\dfrac{2n + 1}{4}$

C. $\dfrac{2n + 1}{3}$

D. $\dfrac{2n + 1}{2}$

Answer: C

1. I.The mean deviation of 6,7,10,12,13,4,12,16 about mean is 3.25.

II. The mean deivation of 6,7,10,12,13,4,12,16 about median is 3.25.

    A. only I is true

    B. only II is ture

    C. both I and II are true

    D. neither I nor II true

Answer: C

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2. I. The variance of first 5 natural number is 2 .

II :The standard deviation of first 3 positive intergers is 2/3.

    A. only I is ture

    B. only II is ture

    C. both I and II are true

    D. neither I nor II true

Answer: C

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Exercise 2 Set 2

1. If the mean, variance, standard deviation of 3,4,5 are denoted by a,b,c then .

    A. $a < b < c$

    B. $c < b < a$

    C. $b < c < a$

    D. $a < c < b$

Answer: A

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2. If the range, mena deviation variance standarad deviation of 1,2,3,4,5 are respectively denoted by a,b,c then

A. $a < b < c < d$

B. $b < c < a < d$

C. $b < d < c < a$

D. $a < c < d < b$

Answer: B

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Exercise 2 Set 3

1. Match the following :

I.   Mean deviation of 1, 3, 5 about mean is   a) 2/3
II. Mean deviation of − 1, 0, 4 about median is   b) $\sqrt{2}$
III. Variance of 3, 4, 5 is   c) 4/3
IV. Standard deviation of 1, 0, 2, 3, 4 is   d) 5/3

A. a,b,c,d

B. b,c,d,a

C. c,d,a,b

D. d,a,c,b

Answer: A

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2. Match the following :

I.	Range of first 5 natural numbers is	a) 1·2
II.	Mean deviation of first 5 natural numbers through mean is	b) $\sqrt{2}$
III.	Variance of first 5 natural numbers is	c) 2
IV.	Standard deviation of first 5 natural numbers is	d) 4

A. a,b,c,d

B. b,c,d,a

C. c,d,a,b

D. d,a,c,b

Answer: C

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Exercise 2 Set 4

1. Let $X_1, X_2, \ldots\ldots X_n$ be n observations, and let $\bar{x}$ be their arithmetic mean and σ^2 be their variance .

Statement 1 : Arithmetic mean of $x_1 + 2, x_2 + 2, x_3 + 2, \ldots\ldots, x_n + 2$ is $\bar{x} + 2$

Statement 2 : Variance of `x_(1)

A. Statemnet 1 is ture , Statement 2 is ture, Statement 2

is a correct explanation for Statement 1

B. Statement 1 is ture Statement 2 is false

C. Statement 1 is false false , Statement 2 is ture

D. Statement 1 is ture , Statement 2 is true, Statement 2

is correct explanation for Statement 1

Answer: B

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2. Let $x_1, x_2, \ldots\ldots\ldots, x_n$ be n observation , and let $\bar{x}$ be

thrir arithmetic mean and σ^2 be their variance.

Statement 1 : Variance of $2x_1, 2x_2, \ldots, 2x_n$ is $4\sigma^2$.

Statement 2 : Arithmetic mean of $2x_1, 2x_2, \ldots, 2x_n$ is $4\bar{x}$.

A. Statemnet 1 is ture , Statement 2 is ture, Statement 2

is a correct explanation for Statement 1

B. Statement 1 is ture Statement 2 is false

C. Statement 1 is false false , Statement 2 is ture

D. Statement 1 is ture , Statement 2 is true, Statement 2

is correct explanation for Statement 1

Answer: B

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