



MATHS

JEE (MAIN AND ADVANCED MATHEMATICS) FOR BOARD AND COMPETITIVE EXAMS

STATISTICS

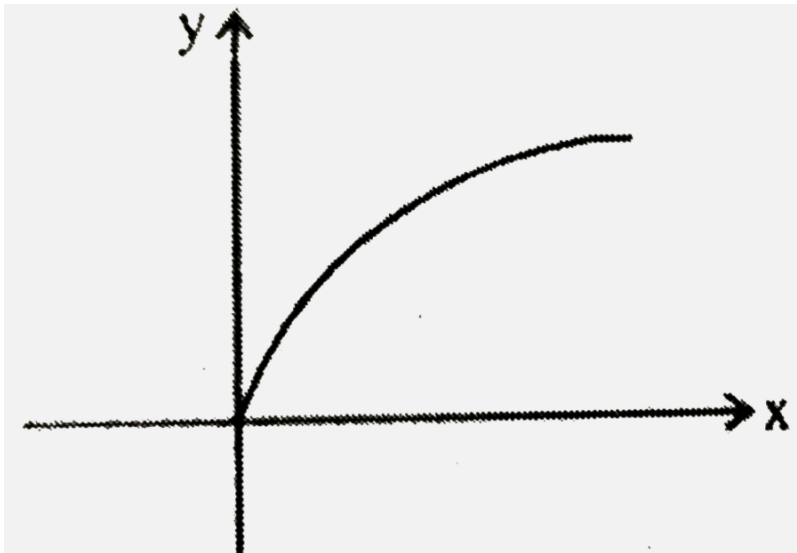
Example

1. The table below given the percentage distribution of female teachers in the primary schools of rural areas of various states and union territories (U.T.) of India . Find

the mean percentage of female teachers .

Percentage of female teachers	15 – 25	25 – 35	35 – 45	45 – 55	55 – 65	65 – 75	75 – 85
Number of States/U.T.	6	11	7	4	4	2	1

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3. Find the mean deviation about the mean for the following data :

9,2,7,10,5,12,4,7



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4. Find the mean deviation about the median for the following data 2,4,6,3,9,3,15,7,12



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5. Find the mean deviation about the mean for the following data :

x_i	3	4	7	9	10	12
f_i	2	5	10	6	4	6

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6. 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	4	2	8	3	10	5	4

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7. 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

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8. Find the variance and standard deviation of the following data : 4,6,10,12,14,18,20



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9. Calculate the mean, variance and standard deviation for the following data :

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



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10. Find the standard deviation for the following data

x_i	4	5	8	13	18
f_i	3	7	12	10	5



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11. Calculate variance and standard deviation for the following distribution.

Classes	70-75	75-80	80-85	85-90	90-95	95-100	100-105	105-110	110-115
Frequency	3	4	7	7	15	9	6	6	3



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12. Find the mean, median and mode of the following data

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	4	5	13	20	14	8



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13. If the median of the distribution given below is 28.5, find the value of x and y . Class interval: 0-10 10-20 20-30 30-40 40-50 50-60 No. of students: 5 x 20 15 y 5



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14. Find the mean , mean deviation about the mean , variance and standard deviation for the following data

4,15,14,12,6,8,11



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15. Find the mean , mean deviation about the mean , variance and standard deviation for the following data

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



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16. Find the mean for the following data

Class	33 – 36	37 – 40	41 – 44	45 – 48	49 – 52
Frequency	15	17	21	22	25



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17. Find the standard deviation for the following data

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

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18. 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

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19. Find the mean, variance and standard deviation using short-cut method.

Class	70 – 75	75 – 80	80 – 85	85 – 90	90 – 95	95 – 100	100 – 105	105 – 110	110 – 115
f_i	3	4	7	7	15	9	6	6	3



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20. 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 wages earners	586	684
Mean of monthly wages	Rs. 5253	Rs. 5253
Variance of the distribution of wages	100	121

Which firm A or B pays to larger mount as monthly wages? Which firm A or B shows greater variability in individual wages?



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Section A Competition Level

1. Median of the data 10,21,5,6,4,12,14,3, is

A. 16

B. 8

C. 4

D. None of these

Answer: 8



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2. mean deviation about median for the following data

2,5,7,2,4,6,10,12,5

A. 2.4

B. 3

C. 1.9

D. None of these

Answer: 1



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3. If two distributions have equal means, then

- A. The distributions with lesser S.D. is more consistent
- B. The distributions with lesser S.D. is less consistent
- C. Their C.V.'s will also have equal
- D. None of these

Answer: 1



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4. Coefficients of variation of two distribution are 15 and 20 and their means are 20 and 10 respectively. If their standard deviations are σ_1 and σ_2 then

A. $3\sigma_1 = 2\sigma_2$

B. $\sigma_1 < \sigma_2$

C. $2\sigma_1 = 3\sigma_2$

D. None of these

Answer: 3



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5. Given the that variance of 50 observations is 18. If each of the 50 observations is increased by 2, then variance of new data is

A. 50

B. 52

C. 18

D. 25

Answer: 3



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6. Given the variance of 30 observations is 20. if each of the observations is divided by 2, then new variance of the resulting observations is

A. 20

B. 10

C. 5

D. None of these

Answer: 3



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7. The mean of 5 observations 1,2,6,x and y is 4.4 and their variance is 8.24 , then $x+y$ is

A. 4

B. 9

C. 15

D. 13

Answer: 4

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8.

Given

$$\sum_{i=1}^{20} a_i = 100, \sum_{i=1}^{20} a_i^2 = 600, \sum_{i=1}^{20} b_i = 140, \sum_{i=1}^{20} b_i^2 = 1000$$

, where a_i, b_i denotes length and weight of an observations. Then which is more varying ?

A. (a)Length

B. (b)Weight

C. (c)Equal C.V.

D. (d)None of these

Answer: 1

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9. The mean of 50 observations were calculated as 4.04 by Mohan who took by mistake 10 instead of 8 for one observation. The correct mean is

A. 4.08

B. 3.95

C. 4.01

D. 4

Answer: 4



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10. If $\sum_{i=1}^{10} x_i = 60$ and $\sum_{i=1}^{10} x_i^2 = 360$ then $\sum_{i=1}^{10} x_i^3$ is

A. a) 2160

B. b) 3250

C. c) 3360

D. d) None of these

Answer: 1



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Section B Linked Comprehension

1. Median of a distribution is the value of the variable which divides it into equal parts . In case of individual observations $x_1, x_2 .. x_n$, if the number of observations is odd, then median is the value of $\left(\frac{n+1}{2}\right)$ th observation when the observations have been arranged in ascending or descending order of magnitude. In case of even number of observations median is the A.M. of the values of $\left(\frac{n}{2}\right)$ th and $\left(\frac{n}{2} + 1\right)$ th observations, arranged in ascending or descending order of magnitude . The mode of distribution is that value of the variable for which the frequency is maximum .

Median of the distribution 8,5,7,9,13,11,20,23 , 25 ,28 , 27 is

A. (a)11

B. (b)13

C. (c)12

D. (d)20

Answer: 2



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2. Median of a distribution is the value of the variable which divides it into equal parts . In case of individual observations $x_1, x_2 .. x_n$, if the number of observations is odd, then median is the value of $\left(\frac{n+1}{2}\right)$ th observation when the observations have been arranged in ascending or descending order of magnitude. In case of even number of observations median is the A.M. of the values of $\left(\frac{n}{2}\right)$ th and $\left(\frac{n}{2} + 1\right)$ th observations,

arranged in ascending or descending order of magnitude

. The mode of distribution is that value of the variable for which the frequency is maximum .

Median of the distribution 25,20,11,3,12,18,17 ,9,21,22 is

A. (a)17

B. (b)18

C. (c)17.5

D. (d)19

Answer: 3



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3. Median of a distribution is the value of the variable which divides it into equal parts . In case of individual observations $x_1, x_2 .. x_n$, if the number of observations is odd, then median is the value of $\left(\frac{n + 1}{2}\right)$ th observation when the observations have been arranged in ascending or descending order of magnitude. In case of even number of observations median is the A.M. of the values of $\left(\frac{n}{2}\right)$ th and $\left(\frac{n}{2} + 1\right)$ th observations, arranged in ascending or descending order of magnitude . The mode of distribution is that value of the variable for which the frequency is maximum .

The	mode	of	following	series	is					
value (x)	40	44	48	52	56	62	64	72	76	
frequency (f)	10	12	14	20	15	19	18	8	4	

A. (a)76

B. (b)64

C. (c)62

D. (d)52

Answer: 4



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4. The standard deviation (σ) of variate x is the square root of the A.M. of the squares of all deviations of x from the A.M. observations.

If x_i / f_i , $i=1,2,\dots, n$ is a frequency distribution then

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^n f_i (x_i - \bar{x})^2}, \quad N = \sum_{i=1}^n f_i \text{ and variance is}$$

the square of standard deviation. Coefficient of

dispersion is $\frac{\sigma}{x}$ and coefficient of variation is $\frac{\sigma}{x} \times 100$

For a given distribution of marks mean is 35.16 and its standard deviation is 19.76 then coefficient of variation is

- A. (a)1.778
- B. (b)0.562
- C. (c)177.8
- D. (d)56.2

Answer: 4



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5. The standard deviation (σ) of variate x is the square root of the A.M. of the squares of all deviations of x from

the A.M. observations.

If x_i / f_i , $i=1,2,\dots, n$ is a frequency distribution then

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^n f_i (x_i - \bar{x})^2}, N = \sum_{i=1}^n f_i \text{ and variance is}$$

the square of standard deviation. Coefficient of

dispersion is $\frac{\sigma}{x}$ and coefficient of variation is $\frac{\sigma}{x} \times 100$

The standard deviation for the set of numbers 1,4,5,7,8 is

2.45 then coefficient of dispersion is

A. 4.9

B. 2.04

C. 0.49

D. 2.45

Answer: 3



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Section C Assertion Reason

1. Statement-1 :The A.M. of series $1, 2, 4, 8, 16, \dots, 2^n$ is

$$\frac{2^{n+1} - 1}{n + 1}$$

Statement-2 : Arithmetic mean (A.M.) of ungrouped data

is $\frac{\sum x_i}{n}$ where x_1, x_2, \dots, x_n are n numbers .

A. (a) Statement-1 is True, Statement-2 is True ,

Statement-2 is a correct explanation for Statement-1

B. (b) Statement-1 is True, Statement-2 is True ,

Statement-2 is NOT a correct explanation for

Statement-1

C. (c) Statement-1 is True , Statement-2 is False

D. (d) Statement-1 is False , Statement-2 is True

Answer: 1



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2. Statement-1 : $\begin{array}{cccccc} x: & 5 & 6 & 7 & 8 & 9 \\ y: & 4 & 6 & 12 & - & 8 \end{array}$ for given data
mean of $x(\bar{x})$ is found to be 7.3. The missing frequency is
10

Statement-2: In case of a frequency distribution ,

$$\bar{x} = \frac{\sum f_i x_i}{\sum x_i}$$

A. a) Both statement I and statement II are correct.

Statement II is correct explanation of statement I

B. b) Both statement I and statement II are correct.

Statement II is not the correct explanation of statement I

C. c) Statement I is correct and statement II is incorrect.

D. d) Statement I is incorrect and statement II is correct.

Answer: 1



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3. Statement-1 :The mode of the items given as 0, 1, 6, 7, 2, 3, 7, 6, 6, 2, 6, 0, 5, 6, 0 is 6.

Statement-2 : Mode is the observation with maximum frequency , whenever the other observations have for less frequencies.

A. a) Both statement I and statement II are correct.

Statement II is correct explanation of statement I

B. b) Both statement I and statement II are correct.

Statement II is not the correct explanation of statement I

C. c) Statement I is correct and statement II is incorrect.

D. d) Statement I is incorrect and statement II is correct.

Answer: 1



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4. Statement-1 : The mean of the series x_1, x_2, \dots, x_n is \bar{x} . If x_2 is replaced by λ then new mean is independent of λ

Statement-2 : \bar{x} (mean) = $\frac{x_1 + x_2 + \dots + x_n}{n}$

A. a) Both statement I and statement II are correct.

Statement II is correct explanation of statement I

B. b) Both statement I and statement II are correct.

Statement II is not the correct explanation of statement I

C. c) Statement I is correct and statement II is incorrect.

D. d) Statement I is incorrect and statement II is correct.

Answer: 4



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5. Statement-1 : If the mode of the data is 18 and the mean is 24, then median is 22

Statement-2 : Mode = 3 median - 2 mean A. Statement -1 is true , statement -2 is true B. Statement -1 is true but

statement -2 is false. C.Statement -1 is false but statement -2 is true. D.none of these

- A. Statement -1 is true , statement -2 is true
- B. Statement -1 is true but statement -2 is false.
- C. Statement -1 is false but statement -2 is true.
- D. none of these

Answer: 1



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6. Statement-1 : The median of a set of 9 distinct observations is 20.5. if each of the largest 4 observations of the set is increased by 2 then median of new set

remains the same as that of the original.

Statement-2 : If the variable of a series are arranged in ascending or descending order, then the value of the middle variable is defined as median .



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7. Statement-1 : The mean deviation of the numbers 3, 4, 5, 6, 7 is 1.2

Statement-2 : Mean deviation = $\frac{\sum_{i=1}^n |x_i - \bar{x}|}{n}$.

A. a) Both statement I and statement II are correct.

Statement II is the correct explanation of statement

I.

B. b) Both statement I and statement II are correct.

Statement II is not the correct explanation of statement I.

C. c) Statement I is correct and statement II is incorrect.

D. d) Statement I is incorrect and statement II is correct.

Answer: 1



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8. Statement-1 : If $a_1, a_2, a_3, \dots, a_n$ are positive real numbers , whose product is a fixed number c , then the

minimum value of $a_1 + a_2 + \dots + a_{n-1} + 2a_n$ is $n(2C)^{\frac{1}{n}}$

Statement-2 : A.M. \geq G.M.

A. a) Both statement I and statement II are correct.

Statement II is the correct explanation of statement I.

B. b) Both statement I and statement II are correct.

Statement II is not the correct explanation of statement I.

C. c) Statement I is correct and statement II is incorrect.

D. d) Statement I is incorrect and statement II is correct.

Answer: 1



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9. Statement-1 :If $a \leq x_i \leq b$ where x_i denotes the value of x in the i^{th} case for $i=1,2,\dots,n$, then $(b - a)^2 \leq \text{Variance (x)}$.

Statement-2 : S.D. $\leq \text{range (b-a)}$



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10. Find the correct Statement :Statement-1 : The S.D. of 5 scores 1 2 3 4 5 is $\sqrt{2}$.

Statement-2 : S.D. $= \sqrt{\text{variance}}$

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11. Statement-1 :Variance of first n natural number is

$$\frac{n^2 - 1}{12}.$$

Statement-2 : S.D. of first n natural number is $\sqrt{\frac{n^2 - 1}{12}}$

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12. Statement-1 : The variance of the variates 112, 116, 120,125,132 about their A.M. is 48.8.

$$\text{Statement-2 : } \sigma = \sqrt{\frac{\sum_{i=1}^n f_i (x_i - \bar{x})^2}{\sum_{i=1}^n f_i}}$$

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13. Statement-1 : if the S.D. of a variable x is 6, then the S.D. of $ax + b$ is $|a| \cdot 6$.

Statement-2 : The variance and S.D. is not independent of change of scale



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14. Statement-1 : The weighted mean of first n natural numbers whose weights are equal is given by $\left(\frac{n+1}{2}\right)$.

Statement-2 : If $\omega_1, \omega_2, \omega_3, \dots, \omega_n$ be the weights assigned to be n values x_1, x_2, \dots, x_n respectively of a variable x ,

then weighted A.M. is equal to $\frac{\sum_{i=1}^n \omega_i x_i}{\sum_{i=1}^n \omega_i}$



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15. Statement-1 :if each of n numbers $x_i = i$ is replaced by $(i + 1)x_i$, then the new mean becomes
$$\frac{(n + 1)(5n + 4)}{6}$$

Statement-2 : A.M. =
$$\frac{\sum_{i=1}^n x_i}{n}.$$

A. a) Both statement I and statement II are correct.

Statement II is the correct explanation of statement I.

B. b) Both statement I and statement II are correct.

Statement II is not the correct explanation of statement I.

C. c) Statement I is correct and statement II is incorrect.

D. d) Statement I is incorrect and statement II is correct.

Answer: 4



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