



## MATHS

### NCERT - NCERT MATHEMATICS (GUJRATI)

#### STATISTICS

#### Example

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

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



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2. 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 .

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

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4. 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

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5. Find the variance of the following data:

6,8,10,12,14,16,18,20,22,24

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6. Two plant A and B of a factory show following results about the number of workers and the wages paid to them.

	A	B
No. 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 ?

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

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8. 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 <sup>2</sup>	23.1361 kg <sup>2</sup>

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

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

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10. 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.

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11. If each of the observations  $x_1, x_2, \dots, x_n$  is increased by 'a', where a is a negative or positive number, show that the variance remains unchanged.

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12. The mean and standard deviation of 100 observation 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 standard deviation?

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## Exercise 15 1

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

4,7,8,9,10,12,13,17

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

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



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

13,17,16,14,11,13,10,16,11,18,12,17



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4. Find the mean deviation about the median for the data :

36,72,46,42,60,45,53,46,51,49



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

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

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

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

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7. Find the mean deviation about the median for the data in

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



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8. Find the mean deviation about the median for the data

in

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



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9. Find the mean deviation about the mean for the data in

એક દિવસની આવક	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800
વ્યક્તિઓની સંખ્યા	4	8	9	10	7	5	4	3

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

Height in cms.	95-105	105-115	115-125	125-135	135-145	145-155
No. of Boys	9	13	26	30	12	10

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11. 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

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12. Calculate the mean deviation about median age 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
No.	5	6	12	14	26	12	16	9

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## Exercise 15 2

1. Find the mean and variance for each of the data :

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

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2. Find the mean and variance for each of the data :

First  $n$  natural numbers .

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3. Find the mean and variance for each of the data :

First 10 multiple of 3.

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4. 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

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5. 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

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6. 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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7. Find the mean and variance for the following frequency distributions in

वर्ग	0-30	30-60	60-90	90-120	120-150	150-180	180-210
आवृत्ति	2	3	5	10	3	5	2

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8. Find the mean and variance for the following frequency distribution :

<b>Class</b>	<b>0 - 10</b>	<b>10 - 20</b>	<b>20 - 30</b>	<b>30 - 40</b>	<b>40 - 50</b>
<b>Freq.</b>	<b>5</b>	<b>8</b>	<b>15</b>	<b>16</b>	<b>6</b>

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

ઊંચાઈ સેમીમાં	70-75	75-80	80-85	85-90	90-95	95-100	100-105	105-110	110-115
બાળકોની સંખ્યા	3	4	7	7	15	9	6	6	3

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

વ્યાસ	33-36	37-40	41-44	45-48	49-52
વર્તુળોની સંખ્યા	15	17	21	22	25

Calculate the standard deviation and mean diameter of the circles.

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## Exercise 15 3

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

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



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2. 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	₹ 5253	₹ 5253
Variance of the distribution of wages	100	121

- (i) Which firm A or B pays larger amount as monthly wages?
- (ii) Which firm , A or B, shows greater variability in individual wages?

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3. The sum and sum of squares corresponding to length  $x$  (in cm) and weight  $y$  (in gm) of 50 plant products are given below:

$$\sum_{i=1}^{50} x_i = 212, \quad \sum_{i=1}^{50} x_i^2 = 902.8, \quad \sum_{i=1}^{50} y_i = 261, \quad \sum_{i=1}^{50} y_i^2 = 1457.6$$

Which is more varying, the length or weight?

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## Miscellaneous Exercise On Chapter 15

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

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2. The mean and variance of 7 observation are 8 and 16, respectively. If five of the observation are 2,4,10,12,14 . Find the remaining two observations.

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3. 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

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4. Given that  $\bar{x}$  is the mean and  $\sigma^2$  is the variance of  $n$  observation  $x_1, x_2, \dots, x_n$ . Prove that the mean and  $\sigma^2$  is the variance of  $n$  observations  $ax_1, ax_2, ax_3, \dots, ax_n$  are  $a\bar{x}$  and  $a^2\sigma^2$ , respectively, ( $a \neq 0$ ).

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5. The mean and standard deviation of 20 observations 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.



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6. 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	Maths	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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7. 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.

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