

EXERCISE

SECTION-A

- This section contains **TWENTY** questions.
- Each question has **FOUR** options (1), (2), (3) and (4). **ONLY ONE** of these four options is correct.
- For each question, darken the bubble corresponding to the correct option in the ORS.
- For each question, marks will be awarded in one of the following categories:
Full Marks : +4, if only the bubble corresponding to the correct option is darkened.
Zero Marks : 0, if none of the bubbles is darkened.
Negative Marks : -1, in all other cases

1. If difference between mean and mode is 3, the difference between mean and median is
 (1) 3 (2) 1 (3) 4 (4) 2 **MSI001**

2. If $\sum_{i=1}^{11} (x_i - 4) = 11$ and $\sum_{i=1}^{11} (x_i - 4)^2 = 44$ then find variance of $x_1, x_2, x_3, \dots, x_{11}$.
 (1) 4 (2) 3 (3) 7 (4) 11 **MSI002**

3. The mean of 11 observations is 25. If each observation is decreased by 5, the new mean will be
 (1) 25 (2) 30 (3) 20 (4) 15 **MSI003**

4. Range of data 13, 14, 19, 21, 17, 14, 14, 12 is
 (1) 7 (2) 14 (3) 9 (4) 21 **MSI004**

5. The mean of 2 samples of sizes 50 & 40 were found to be 63 and 54. Their variance were 81 & 36. Find the variance of combined sample of size 90
 (1) 9 (2) 81 (3) 3 (4) 243 **MSI005**

6. Rohan worked for a firm as given below

No. of weeks	Days each week he worked
2 weeks	1 day each week
14 weeks	2 day each week
8 weeks	5 day each week
32 weeks	7 day each week

What is the mean number of days Rohan works per week
 (1) 5 (2) 6 (3) 5.5 (4) 5.25 **MSI006**

7. Find the mode of the data 3, 1, 1, 2, 3, 0, -3, 4, 1, 2, 3, 3, 5
 (1) 1 (2) 2 (3) 0 (4) 3 **MSI007**
8. Coefficient of range 5, 2, 4, 3, 8, 11 is
 (1) $\frac{9}{13}$ (2) $\frac{1}{11}$ (3) $\frac{6}{10}$ (4) $\frac{6}{16}$ **MSI008**
9. If $\text{var}(x_i) = \lambda$ then $\text{var}(2x_i + 3)$ is
 (1) $2\lambda + 3$ (2) $2\lambda^2$ (3) 4λ (4) $4\lambda + 9$ **MSI009**
10. The mean of distribution is 6. If coefficient of variation is 50%, then standard deviation of distribution is
 (1) 9 (2) 3 (3) 300 (4) 4 **MSI010**
11. The mean deviation about median of variation 53, 54, 55, 100 is
 (1) 11.5 (2) 12 (3) 12.5 (4) 13 **MSI011**
12. Variance of first n natural numbers.
 (1) $\frac{n^2-1}{24}$ (2) $\frac{n^2-1}{12}$ (3) $\frac{n^2-1}{6}$ (4) $\frac{n^2-1}{3}$ **MSI012**
13. In a batch of 20 students 8 have failed. The marks of the successful candidates are 23, 27, 29, 18, 17, 19, 21, 27, 20, 24, 26, 28 the median marks are
 (1) 22 (2) 18 (3) 18.5 (4) can't determine **MSI013**
14. The mean of two samples of sizes 20 and 10 were found to be 11, 8 respectively. Their variance were 4 and 34 respectively. Find the variance of combined sample of size 30.
 (1) 19 (2) 19.5 (3) 18.5 (4) 16 **MSI014**
15. The mean and variance of 100 numbers were calculated as 11 and 2 respectively. Later it was found that one of the number was misread 5 instead of 9. How does the variance change.
 (1) Variance doesn't change (2) Variance Increases
 (3) Variance decreases (4) Can't comment **MSI015**
16. The variance of first 5 even natural numbers is
 (1) 6 (2) 7 (3) 8 (4) 9 **MSI016**
17. If variance of x_1, x_2, x_3, x_4, x_5 is σ^2 , find variance of $3x_1 + 4, 3x_2 + 4, 3x_3 + 4, 3x_4 + 4, 3x_5 + 4$
 (1) $4\sigma^2 + 3$ (2) $4\sigma^2 + 9$ (3) $9\sigma^2$ (4) $4\sigma^2 - 3$ **MSI017**
18. Find the mean deviation about median of 34, 38, 42, 55, 63, 46, 54, 44, 70, 48
 (1) 8.2 (2) 8.4 (3) 8.6 (4) 8.8 **MSI018**
19. If S.D. of $x_1, x_2, x_3, \dots, x_n$ is 3 then S. D of $-4x_1, -4x_2, \dots, -4x_n$ is
 (1) -12 (2) 12 (3) -6 (4) 6 **MSI019**

20. The mean and variance of 7 observation are 7 and $\frac{100}{7}$. If 5 of the observation are 2, 4, 7, 11, 10 find the remaining 2 observations.
 (1) 3, 6 (2) 3, 12 (3) 4, 11 (4) 5, 10

MSI020

SECTION-B

- This section will have **TEN** questions. Candidate can choose to attempt any 5 question out of these 10 questions. In case if candidate attempts more than 5 questions, first 5 attempted questions will be considered for marking.
- The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value (Answer should be rounded off to the nearest integer).
- Answer to each question will be evaluated according to the following marking scheme:
 Full Marks : +4, if only correct answer is given.
 Zero Marks : 0, if no answer is given.
 Negative Marks : -1 for incorrect answer

1. Find the AM of the following frequency distribution.

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
f_i	2	4	5	3	1

MSI021

2. If sum of deviation of a number of observation about 4 is 30 and about 3 is 40, then mean of set of observation is

MSI022

3. Find the median of 99, 78, 80, 94, 92, 76, 86, 96.

MSI023

4. Find the median of the following frequency distribution.

x_i	160	150	152	161	156	154	155
f_i	12	8	4	4	3	3	7

MSI024

5. If the M.D. of the numbers 6, 7, 10, 12, 13, 4, 8, 12 about their mean is λ , then the value of 4λ is

MSI025

6. If the M.D. of the numbers 34, 38, 42, 44, 46, 48, 54, 55, 63, 70 about their median is λ , then the value of 5λ is

MSI026

7. If the M.D. of the following frequency distribution about Median is λ , then the value of 100λ is

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
f_i	2	8	10	4	6

MSI027

8. if the variance of 112, 116, 120, 125, 132 is λ , then the value of 5λ is

MSI028

9. In a set of $2n$ observation, half of them equals to ' a ' and rest half equals to ' $-a$ ' each. If $S. D.$ of data is '2' then $|a|$ equals.

MSI029

10. If variance of observation 1, 2, 3, 10 is $\frac{25}{16}$, then $S. D.$ of observation 4, 8, 12 40 is

MSI030

EXERCISE - JEE (Main) PYQ

1. A data consists of n observations: x_1, x_2, \dots, x_n . If $\sum_{i=1}^n (x_i + 1)^2 = 9n$ and $\sum_{i=1}^n (x_i - 1)^2 = 5n$, then the standard deviation of this data is: **[JEE (Main) 2019]**
 (1) 5 (2) $\sqrt{5}$ (3) $\sqrt{7}$ (4) 2
MSI033
2. The mean of five observations is 5 and their variance is 9.20. If three of the given five observations are 1, 3 and 8, then a ratio of other two observations is: **[JEE (Main) 2019]**
 (1) 4 : 9 (2) 6 : 7 (3) 5 : 8 (4) 10 : 3
MSI034
3. If mean and standard deviation of 5 observations x_1, x_2, x_3, x_4, x_5 are 10 and 3, respectively, then the variance of 6 observations x_1, x_2, \dots, x_5 and -50 is equal to: **[JEE (Main) 2019]**
 (1) 582.5 (2) 507.5 (3) 586.5 (4) 509.5
MSI035
4. The outcome of each of 30 items was observed; 10 items gave an outcome $\left(\frac{1}{2} - d\right)$ each, 10 items gave outcome $\frac{1}{2}$ each and the remaining 10 items gave outcome $\left(\frac{1}{2} + d\right)$ each. If the variance of this outcome data is $\frac{4}{3}$ then $|d|$ equals: **[JEE (Main) 2019]**
 (1) 2 (2) $\frac{\sqrt{5}}{2}$ (3) $\frac{2}{3}$ (4) $\sqrt{2}$
MSI036
5. If the sum of the deviations of 50 observations from 30 is 50, then the mean of these observation is: **[JEE (Main) 2019]**
 (1) 50 (2) 51 (3) 30 (4) 31
MSI037
6. The mean and the variance of five observation are 4 and 5.20, respectively. If three of the observations are 3, 4 and 4; then then absolute value of the difference of the other two observations, is: **[JEE (Main) 2019]**
 (1) 1 (2) 3 (3) 7 (4) 5
MSI038
7. The mean and variance of seven observations are 8 and 16, respectively. If 5 of the observations are 2, 4, 10, 12, 14, then the product of the remaining two observations is : **[JEE (Main) 2019]**
 (1) 40 (2) 49 (3) 48 (4) 45
MSI039
8. A student scores the following marks in five tests : 45, 54, 41, 57, 43. His score is not known for the sixth test. If the mean score is 48 in the six tests, then the standard deviation of the marks in six tests is **[JEE (Main) 2019]**
 (1) $\frac{10}{\sqrt{3}}$ (2) $\frac{100}{\sqrt{3}}$ (3) $\frac{100}{3}$ (4) $\frac{10}{3}$
MSI040

9. If the standard deviation of the numbers $-1, 0, 1, k$ is $\sqrt{5}$ where $k > 0$, then k is equal to **[JEE (Main) 2019]**
- (1) $2\sqrt{\frac{10}{3}}$ (2) $2\sqrt{6}$ (3) $4\sqrt{\frac{5}{3}}$ (4) $\sqrt{6}$
- MSI041**
10. The mean and the median of the following ten numbers in increasing order 10, 22, 26, 29, 34, x 42, 67, 70, y are 42 and 35 respectively, then $\frac{y}{x}$ is equal to: **[JEE (Main) 2019]**
- (1) $7/3$ (2) $9/4$ (3) $7/2$ (4) $8/3$
- MSI042**
11. If both the mean and the standard deviation of 50 observations x_1, x_2, \dots, x_{50} are equal to 16, then the mean of $(x_1 - 4)^2, (x_2 - 4)^2, \dots, (x_{50} - 4)^2$ is: **[JEE (Main) 2019]**
- (1) 525 (2) 380 (3) 480 (4) 400
- MSI044**
12. The mean and variance of 20 observations are found to be 10 and 4, respectively. On rechecking, it was found that an observation 9 was incorrect and the correct observation was 11. Then the correct variance is **[JEE (Main) 2020]**
- (1) 3.99 (2) 3.98 (3) 4.02 (4) 4.01
- MSI046**
13. The mean and the standard deviation (*s. d.*) of 10 observations are 20 and 2 respectively. Each of these 10 observations is multiplied by p and then reduced by q , where $p \neq 0$ and $q \neq 0$. If the new mean and new *s. d.* become half of their original values, then q is equal to **[JEE (Main) 2020]**
- (1) -20 (2) 10 (3) -10 (4) -5
- MSI047**
14. Let the observations $x_i (1 \leq i \leq 10)$ satisfy the equations, $\sum_{i=1}^{10} (x_i - 5) = 10$ and $\sum_{i=1}^{10} (x_i - 5)^2 = 40$. If μ and λ are the mean and the variance of the observations, $x_1 - 3, x_2 - 3, \dots, x_{10} - 3$, then the ordered pair (μ, λ) is equal to: **[JEE (Main) 2020]**
- (1) (6, 6) (2) (3, 6) (3) (6, 3) (4) (3, 3)
- MSI048**
15. Consider a set of $3n$ numbers having variance 4. In this set, the mean of first $2n$ numbers is 6 and the mean of the remaining n numbers is 3. A new set is constructed by adding 1 into each of first $2n$ numbers, and subtracting 1 from each of the remaining n numbers. If the variance of the new set is k , then $9k$ is equal to _____. **[JEE (Main) 2021]**
- MSI050**
16. Consider the following frequency distribution :
- | | | | | | |
|------------|-----|------|-------|-------|-------|
| Class: | 0-6 | 6-12 | 12-18 | 18-24 | 24-30 |
| Frequency: | a | b | 12 | 9 | 5 |
- If mean = $\frac{309}{22}$ and median = 14, then the value $(a - b)^2$ is equal to _____. **[JEE (Main) 2021]**
- MSI051**

17. Let X_1, X_2, \dots, X_{18} be eighteen observations such that $\sum_{i=1}^{18} (X_i - \alpha) = 36$ and $\sum_{i=1}^{18} (X_i - \beta)^2 = 90$, where α and β are distinct real numbers. If the standard deviation of these observations is 1, then the value of $|\alpha - \beta|$ is _____. **[JEE (Main) 2021]**
MSI052
18. The mean and standard deviation of 40 observations are 30 and 5 respectively. It was noticed that two of these observations 12 and 10 were wrongly recorded. If σ is the standard deviation of the data after omitting the two wrong observations from the data, then $38\sigma^2$ is equal to _____. **[JEE (Main) 2022]**
MSI053
19. Let $x_1, x_2, x_3, \dots, x_{20}$ be in geometric progression with $x_1 = 3$ and the common ratio $\frac{1}{2}$. A new data is constructed replacing each x_i by $(x_i - i)^2$. If \bar{x} is the mean of new data, then the greatest integer less than or equal to \bar{x} is _____. **[JEE (Main) 2022]**
MSI054
20. Let the mean and the variance of 20 observations x_1, x_2, \dots, x_{20} be 15 and 9, respectively. For $\alpha \in R$, if the mean of $(x_1 + \alpha)^2, (x_2 + \alpha)^2, \dots, (x_{20} + \alpha)^2$ is 178, then the square of the maximum value of α is equal to _____. **[JEE (Main) 2022]**
MSI055
21. Let S be the set of all values of a_1 for which the mean deviation about the mean of 100 consecutive positive integers $a_1, a_2, a_3, \dots, a_{100}$ is 25. Then S is **[JEE (Main) 2023]**
 (1) ϕ (2) $\{99\}$ (3) \mathbb{N} (4) $\{9\}$
MSI056
22. Let $9 = x_1 < x_2 < \dots < x_7$ be in an A.P. with common difference d . If the standard deviation of x_1, x_2, \dots, x_7 is 4 and the mean is \bar{x} , then $\bar{x} + x_6$ is equal to : **[JEE (Main) 2023]**
 (1) $18\left(1 + \frac{1}{\sqrt{3}}\right)$ (2) 34 (3) $2\left(9 + \frac{8}{\sqrt{7}}\right)$ (4) 25
MSI057
23. The mean and variance of 5 observations are 5 and 8 respectively. If 3 observations are 1, 3, 5, then the sum of cubes of the remaining two observations is **[JEE (Main) 2023]**
 (1) 1072 (2) 1792 (3) 1216 (4) 1456
MSI058
24. The mean and variance of 7 observations are 8 and 16 respectively. If one observation 14 is omitted a and b are respectively mean and variance of remaining 6 observation, then $a + 3b - 5$ is equal to. **[JEE (Main) 2023]**
MSI059
25. Let the mean and variance of 12 observations be $\frac{9}{2}$ and 4 respectively. Later on, it was observed that two observations were considered as 9 and 10 instead of 7 and 14 respectively. If the correct variance is $\frac{m}{n}$, where m and n are co-prime, then $m + n$ is equal to **[JEE (Main) 2023]**
 (1) 316 (2) 314 (3) 317 (4) 315
MSI060

26. If the variance of the frequency distribution is 3, then is equal to

x_i	2	3	4	5	6	7	8
Frequency f_i	3	6	16	a	9	5	6

[JEE (Main) 2023]

MSI061

27. If the mean and variance of the frequency distribution

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

are 9 and 15.08 respectively, then the value of $\alpha^2 + \beta^2 - \alpha\beta$ is.

[JEE (Main) 2023]

MSI062

28. Let μ be the mean and σ be the standard deviation of the distribution

x_i	0	1	2	3	4	5
f_i	$k+2$	$2k$	k^2-1	k^2-1	k^2+1	$k-3$

where $\sum f_i = 62$. if $[x]$ denotes the greatest integer $\leq x$, then $[\mu^2 + \sigma^2]$ is equal [JEE (Main) 2023]

(1) 8

(2) 7

(3) 6

(4) 9

MSI063

29. Let $X = \{11, 12, 13, \dots, 40, 41\}$ and $Y = \{61, 62, 63, \dots, 90, 91\}$ be the two sets of observations. If \bar{x} and \bar{y} are their respective means and σ^2 is the variance of all the observations in $X \cup Y$, then $|\bar{x} + \bar{y} - \sigma^2|$ is equal to. [JEE (Main) 2023]

MSI064

30. Let the mean and standard deviation of marks of class A of 100 students be respectively 40 and $\alpha (> 0)$, and the mean and standard deviation of marks of class B of n students be respectively 55 and $30 - \alpha$. If the mean and variance of the marks of the combined class of $100 + n$ students are respectively 50 and 350, then the sum of variances of classes A and B is: [JEE (Main) 2023]

(1) 500

(2) 650

(3) 450

(4) 900

MSI065

ANSWER KEY

EXERCISE

Section-A	Q.	1	2	3	4	5	6	7	8	9	10
	A.	2	2	3	3	2	4	4	1	3	2
	Q.	11	12	13	14	15	16	17	18	19	20
	A.	2	2	3	4	3	3	3	3	2	2
Section-B	Q.	1	2	3	4	5	6	7	8	9	10
	A.	23	7	89	155	11	43	933	244	2	5

EXERCISE - JEE (Main) PYQ

Que.	Q.	1	2	3	4	5	6	7	8	9	10
Ans.	A.	2	1	2	4	4	3	3	1	2	1
Que.	Q.	11	12	13	14	15	16	17	18	19	20
Ans.	A.	4	1	1	4	68	4	4	238	142	4
Que.	Q.	21	22	23	24	25	26	27	28	29	30
Ans.	A.	3	2	1	37	3	5	25	1	603	1