

Exercise – I (JEE-Main Pattern)

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.

- If difference between mean and mode is 3, the difference between mean and median is
 (1) 3 (2) 1 (3) 4 (4) 2 MSI001
- 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
- Then 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
- Range of data 13, 14, 19, 21, 17, 14, 14, 12 is
 (1) 7 (2) 14 (3) 9 (4) 21 MSI004
- 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
- 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
- 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
- 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 questions 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 dist.

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 dist.

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 – II (JEE-Main PYQs)

1. If $\sum_{i=1}^9 (x_i - 5) = 9$ and $\sum_{i=1}^9 (x_i - 5)^2 = 45$, then the standard deviation of the 9 items $x_1, x_2, \dots, x_9$ is

[JEE Main 2018]

(1) 4
(2) 2
(3) 3
(4) 9

MSI031
2. 5 students of a class have an average height 150 cm and variance 18 cm^2 . A new student, whose height is 156 cm, joined them. The variance (in cm^2) of the height of these six students is:

[JEE Main 2019]

(1) 22
(2) 20
(3) 16
(4) 18

MSI032
3. 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
4. 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
5. 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
6. The outcome of each of 30 items was observed; 10 items gave an outcome $\frac{1}{2} - d$ each, 10 items gave outcome $\frac{1}{2}$ each and the remaining 10 items gave outcome $\frac{1}{2} + d$ 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
7. 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

8. 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 the absolute value of the difference of the other two observations, is: [JEE Main 2019]

(1) 1 (2) 3 (3) 7 (4) 5

MSI038

9. 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

10. 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

11. 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

12. 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

13. If for some $x \in R$, the frequency distribution of the marks obtained by 20 students in a test is :

Marks	2	3	5	7
Frequency	$(x+1)^2$	$2x-5$	x^2-3x	x

then the mean of the marks is :

[JEE Main 2019]

(1) 2.8 (2) 3.2 (3) 3.0 (4) 2.5

MSI043

14. 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

15. If the data $x_1, x_2, \dots, x_{10}$ is such that the mean of first four of these is 11, the mean of the remaining six is 16 and the sum of squares of all of these is 2,000; then the standard deviation of this data is : [JEE Main 2019]

(1) 4 (2) 2 (3) $\sqrt{2}$ (4) $2\sqrt{2}$

MSI045

16. 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

17. 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

18. 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

19. If the variance of the first n natural numbers is 10 and the variance of the first m even natural numbers is 16, then $m + n$ is equal to _____. **[JEE Main 2020]**

MSI049

20. 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

21. 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

22. 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

23. 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

24. 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

25. 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

ANSWER KEY

Exercise – I (JEE Main Pattern)

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 – II (JEE Main PYQs)

Question	1	2	3	4	5	6	7	8	9	10
Answer	2	2	2	1	2	4	4	3	3	1
Question	11	12	13	14	15	16	17	18	19	20
Answer	2	1	1	4	2	1	1	4	18	68
Question	21	22	23	24	25					
Answer	4	4	238	142	4					