

Q1. JEE Main 2026 (23 January Shift 1)

Let the mean and variance of 8 numbers $-10, -7, -1, x, y, 9, 2, 16$ be $\frac{7}{2}$ and $\frac{293}{4}$, respectively. Then the mean of 4 numbers $x, y, x + y + 1, |x - y|$ is :

- (1) 11 (2) 12 (3) 10 (4) 9

Q2. JEE Main 2026 (24 January Shift 2)

Let $X = \{x \in \mathbb{N} : 1 \leq x \leq 19\}$ and for some $a, b \in \mathbb{R}$, $Y = \{ax + b : x \in X\}$. If the mean and variance of the elements of Y are 30 and 750, respectively, then the sum of all possible values of b is

- (1) 60 (2) 100 (3) 80 (4) 20

Q3. JEE Main 2026 (22 January Shift 2)

If the mean deviation about the median of the numbers $k, 2k, 3k, \dots, 1000k$ is 500, then k^2 is equal to :

- (1) 9 (2) 1 (3) 4 (4) 16

Q4. JEE Main 2026 (23 January Shift 2)

If the mean and the variance of the data

Class	4-8	8-12	12-16	16-20
Frequency	3	λ	4	7

are μ and 19 respectively, then the value of $\lambda + \mu$ is

- (1) 21 (2) 19 (3) 20 (4) 18

Q5. JEE Main 2026 (21 January Shift 1)

Let the mean and variance of 7 observations $2, 4, 10, x, 12, 14, y$, $x > y$, be 8 and 16 respectively. Two numbers are chosen from $\{1, 2, 3, x - 4, y, 5\}$ one after another without replacement, then the probability, that the smaller number among the two chosen numbers is less than 4, is :

- (1) $\frac{3}{5}$ (2) $\frac{1}{3}$ (3) $\frac{2}{5}$ (4) $\frac{4}{5}$

Q6. JEE Main 2026 (28 January Shift 1)

The mean and variance of 10 observations are 9 and 34.2, respectively. If 8 of these observations are 2, 3, 5, 10, 11, 13, 15, 21, then the mean deviation about the median of all the 10 observations is

- (1) 4 (2) 7 (3) 5 (4) 6

Q7. JEE Main 2026 (24 January Shift 1)

The mean and variance of a data of 10 observations are 10 and 2, respectively. If an observations α in this data is replaced by β , then the mean and variance become 10.1 and 1.99, respectively. Then $\alpha + \beta$ equals

- (1) 15 (2) 5 (3) 10 (4) 20

ANSWERS AND SOLUTIONS

1. (1) 2. (1) 3. (3) 4. (2) 5. (4) 6. (3) 7. (4)

1. (1) Mean = $\frac{7}{2} \cdot -10 - 7 - 1 + x + y + 9 + 2 + 16 = 28 \Rightarrow x + y = 19$.

Variance = $\frac{293}{4} \cdot \frac{\sum x_i^2}{8} - \frac{49}{4} = \frac{293}{4} \Rightarrow \sum x_i^2 = 684$.

Known squares: $100 + 49 + 1 + 81 + 4 + 256 = 491$, so $x^2 + y^2 = 193$.

$(x - y)^2 = x^2 + y^2 - 2xy = 193 - (361 - 193) = 25 \Rightarrow |x - y| = 5$.

$x + y + 1 = 20$.

Mean of $x, y, x + y + 1, |x - y| = \frac{19+20+5}{4} = \frac{44}{4} = 11$.

2. (1) Mean of $X = \frac{1+19}{2} = 10$, Variance of $X = \frac{19^2-1}{12} = 30$.

For $Y = aX + b$: Mean of $Y = 10a + b = 30$ and Variance of $Y = a^2 \cdot 30 = 750$.

$a^2 = 25 \Rightarrow a = 5$ or $a = -5$.

If $a = 5$: $b = 30 - 50 = -20$.

If $a = -5$: $b = 30 + 50 = 80$.

Sum of all possible values of $b = -20 + 80 = 60$.

3. (3) The sequence $k, 2k, 3k, \dots, 1000k$ has 1000 terms.

The median is $\frac{500k+501k}{2} = \frac{1001k}{2}$.

The mean deviation is $MD = \frac{1}{1000} \sum_{i=1}^{1000} |ik - \text{median}|$.

For $i \leq 500$: deviation = $\frac{1001k}{2} - ik$, giving $\sum_{i=1}^{500} (\frac{1001}{2} - i) = 125000$.

By symmetry, the sum for $i \geq 501$ is also 125000.

Thus $MD = \frac{k}{1000} \cdot 250000 = 250k = 500$, so $k = 2$ and $k^2 = 4$.

4. (2) Class midpoints: 6, 10, 14, 18.

Frequencies: 3, λ , 4, 7. $N = 14 + \lambda$.

Mean $\mu = \frac{200+10\lambda}{14+\lambda}$.

$\sum f_i x_i^2 = 3(36) + 100\lambda + 4(196) + 7(324) = 3160 + 100\lambda$.

Variance: $19 = \frac{3160+100\lambda}{N} - \mu^2$.

Let $u = 14 + \lambda$:

$19u^2 = u(1760 + 100u) - (60 + 10u)^2 \Rightarrow 19u^2 - 560u + 3600 = 0$.

$u = \frac{560 \pm 200}{38}$, so $u = 20 \Rightarrow \lambda = 6$.

$\mu = \frac{260}{20} = 13$. Hence $\lambda + \mu = 6 + 13 = 19$.

5. (4) Mean = 8 gives $x + y = 14$.

Variance = 16 gives $(x - 8)^2 + (y - 8)^2 = 4$.

Solving: $x = 8, y = 6$ (since $x > y$).

Set becomes $\{1, 2, 3, 4, 6, 5\} = \{1, 2, 3, 4, 5, 6\}$.

Total ways to choose 2 numbers = $\binom{6}{2} = 15$.

Favorable cases (smaller < 4): smaller = 1 gives 5 pairs, smaller = 2 gives 4 pairs, smaller = 3 gives 3 pairs.

Total favorable = 12.

$$\text{Probability} = \frac{12}{15} = \frac{4}{5}.$$

6. (3) Given 10 observations with mean = 9 and variance = 34.2.

Eight known values: 2, 3, 5, 10, 11, 13, 15, 21.

Sum of all 10: $\sum x_i = 90$.

Sum of 8 known: 80. So the two unknowns sum to 10.

From variance: $\sum x_i^2 = 10(34.2 + 81) = 1152$.

Sum of squares of 8 known: 1094. So unknown squares sum to 58.

With $x_9 + x_{10} = 10$ and $x_9^2 + x_{10}^2 = 58$: we get $x_9 x_{10} = 21$, giving roots $t^2 - 10t + 21 = 0$, so the unknowns are 3 and 7.

All 10 sorted: 2, 3, 3, 5, 7, 7, 10, 11, 13, 15, 21.

$$\text{Median} = \frac{7+10}{2} = 8.5.$$

$$\text{Mean deviation} = \frac{1}{10}(6.5 + 5.5 + 5.5 + 3.5 + 1.5 + 1.5 + 2.5 + 4.5 + 6.5 + 12.5) = \frac{50}{10} = 5$$

7. (4) $n = 10$, mean = 10, variance = 2.

So $\sum x_i = 100$ and $\sum x_i^2 = 10(2 + 100) = 1020$.

After replacing α by β :

$$\text{new mean} = 10.1 \Rightarrow \sum x_i - \alpha + \beta = 101 \Rightarrow \beta - \alpha = 1$$

$$\text{New variance} = 1.99 \Rightarrow \frac{\sum x_i^2 - \alpha^2 + \beta^2}{10} - (10.1)^2 = 1.99$$

$$\sum x_i^2 - \alpha^2 + \beta^2 = 10(1.99 + 102.01) = 1040$$

$$\beta^2 - \alpha^2 = 1040 - 1020 = 20$$

$$(\beta - \alpha)(\beta + \alpha) = 20 \Rightarrow 1 \cdot (\alpha + \beta) = 20$$

$$\alpha + \beta = 20$$