STATISTICS

Q. The frequency distribution of daily working expenditure of families in a locality is as follows : [JEE-Main Online 2012]

Expenditure in ₹ (x)	0 − 50	50 − 100	100 − 150	150 − 200	200 − 250
Number of families (f) :	24	33	37	b	25

If the mode of the distribution is '140' then the value of b is

(A) 34   (B) 31   (C) 26   (D) 36

$$37 > b$$

$$\text{mode} = \ell + \frac{(f_m - f_{m-1}) \times h}{2f_m - f_{m-1} - f_{m+1}}$$

$$140 = \frac{(37 - 33) \times 50}{74 - 33 - b} + 100$$

STATISTICS

Q. The median of 100 observations grouped in classes of equal width is 25. If the median class interval is $20 - 30$ and the number of observations less than $\underline{20}$ is 45, then the frequency of median class is : **[JEE-Main Online 2012]**

(A) 10   (B) 20   (C) 15   (D) 12

$$M = \ell + \frac{\left(\frac{N}{2} - F\right)}{f} \times h$$

$$25 = 20 + \frac{\left(\frac{100}{2} - 45\right)}{f} \times 10$$

$$f = 10$$

STATISTICS

Q. The variance of first 50 even natural numbers is

(A) $\dfrac{437}{4}$ (B) $\dfrac{833}{4}$ (C) 833 (D) 437

$$\sigma^2 = \dfrac{\displaystyle\sum_{r=1}^{50}(2r)^2}{50} - \left(\dfrac{\displaystyle\sum_{r=1}^{50}(2r)}{50}\right)^2$$

$$= 833$$

STATISTICS

Q. In a set of $2n$ distinct observations, each of the observation below the median of all the observations is increased by 5 and each of the remaining observations is decreased by 3. Then the mean of the new set of observations:

[JEE Main Online 2014]

(A) Increases by 1.

(B) Decreases by 1.

(C) Decreases by 2.

(D) Increases by 2.

$$T_1, T_2, \cdots \qquad T_{2n}$$

$$\frac{T_n + T_{n+1}}{2}$$

$$\frac{\displaystyle\sum_{i=1}^{n}(x_i + 5) + \sum_{i=n+1}^{2n}(x_i - 3)}{2n} = \mu + 1$$

Nishant Jindal

STATISTICS

Q. Let $\bar{X}$ and M.D. be the mean and the mean deviation about $\bar{X}$ of n observations $x_i, i = 1, 2, \ldots, n$. If each of the observations is increased by 5, then the new mean and the mean deviation about the new mean, respectively, are:

[JEE-Main Online 2014]

(A) $\bar{X}$, M.D.

(B) $\bar{X} + 5$, M.D. ✓

(C) $\bar{X}$, M.D. + 5

(D) $\bar{X} + 5$, M.D. + 5

$$(MD)' = \frac{\sum |x_i + 5 - (\bar{X} + 5)|}{n} = \underline{\underline{MD}}$$

STATISTICS

Q. The mean of the data set comprising of 16 observations is 16 . If one of the observation valued 16 is deleted and three new observations valued 3,4 and 5 are added to the data, then the mean of the resultant data, is :   [JEE Main-2015]

(A) 14.0   (B) 16.8   (C) 16.0   (D) 15.8

$$\sum_{i=1}^{16} x_i = 16 \times 16$$

$$\mu' = \frac{256 - 16 + 3 + 4 + 5}{18}$$

STATISTICS

Q. A data consists of n observations :

$x_1, x_2, \ldots \ldots, x_n$. 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]**

(A) $\sqrt{7}$ (B) 5   (C) 2   (D) $\sqrt{5}$

$$\sqrt{\frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2}$$

$$= \sqrt{6 - 1} = \sqrt{5}$$

$$\sum_{i=1}^{n} 2(x_i^2 + 1) = 14n \quad 7n$$

$$\boxed{\sum_{i=1}^{n} x_i^2 = 6n}$$

$$4\sum_{i=1}^{n} x_i = 4n$$

$$\sum_{i=1}^{n} x_i = n$$

STATISTICS

Q. 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 $x_1, x_2, \ldots \ldots, x_5$ and -$\underline{50}$ is equal to

[JEE-Main Online 2019]

(A) 582.5   (B) 509.5   (C) 507.5   (D) 586.5

$$\sum_{i=1}^{5} x_i = 50$$

$$\frac{\sum x_i^2}{5} - (10)^2 = 9$$

$$\sum_{i=1}^{5} x_i^2 = 545$$

$$\sigma^2 = \frac{3045}{6} - 0$$

STATISTICS

Q. 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]**

(A) 40 (B) 45 (C) 48 (D) 49

$$42 + x + y = 56 \implies x + y = 14$$

$$\frac{460 + x^2 + y^2}{7} - 64 = 16$$

$$x^2 + y^2 = 100$$

STATISTICS

Q. 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]**

(A) 4.01   (B) 3.99   (C) 3.98   (D) 4.02

STATISTICS

Q. 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]**

(A) -10   (B) -5   (C) 10   (D) -20

STATISTICS

Q. Let the observations $x_i (1 \le i \le 10)$ 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, $x_1 - 3, x_2 - 3, \ldots, x_{10} - 3$, then the ordered pair (μ, λ) is equal to:

[JEE-Main 2020]

(A) $(6, 6)$ **(B)** $(3, 3)$ **(C)** $(3, 6)$ **(D)** $(6, 3)$

STATISTICS

Q. If the mean and variance of eight numbers $3, 7, 9, 12, 13, 20, x$ and y be 10 and 25 respectively, then xy is equal to

[JEE-Main 2020]

$$\boxed{54}$$

STATISTICS

Q. 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.
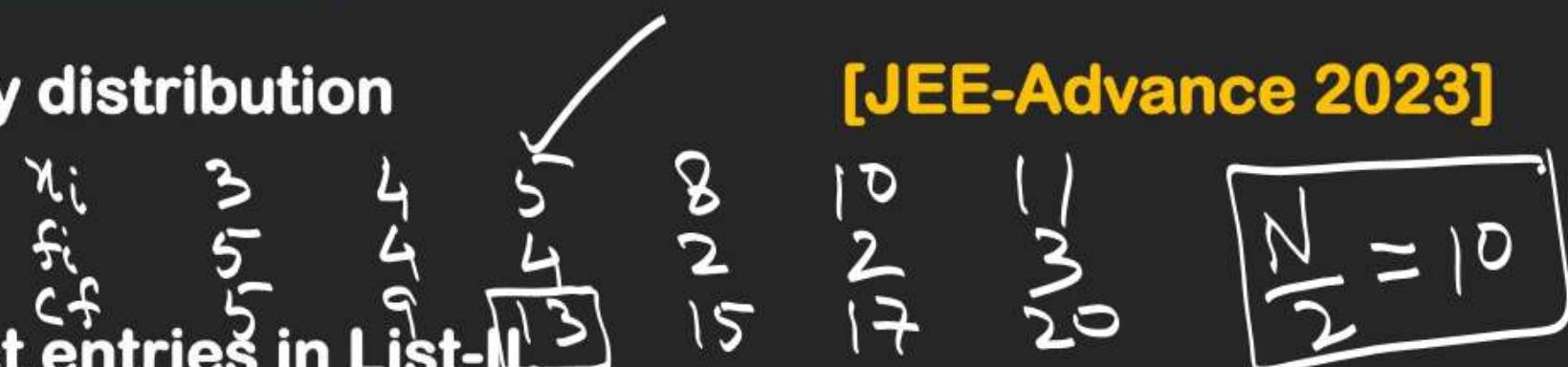
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STATISTICS

Q. Consider the given data with frequency distribution **[JEE-Advance 2023]**

x_i	3	8	11	10	5	4
f_i	5	2	3	2	4	4

Match each entry in List-I to the correct entries in List-II

x_i	3	4	5	8	10	11
f_i	5	4	4	2	2	3
cf	5	9	13	15	17	20

$\dfrac{N}{2} = 10$

List-I		List-II	
(P)	The mean of the above data is $= \boxed{6}$	(1)	2.5
(Q)	The median of the above data is $= \boxed{5}$	(2)	5
(R)	The mean deviation about the mean of the above data is $\dfrac{15+4+15+8+8+4}{20} = 2.7$	(3)	6
(S)	The mean deviation about the median of the above data is $\dfrac{10+5+18+10+0+4}{20}$	(4)	2.7
	$= 2.4$	(5)	2.4

The correct option is

(A) (P)→(3),(Q)→(2),(R)→(4),(S)→(5)   (B) (P)→(3),(Q)→(2),(R)→(1),(S)→(5)

(C) (P)→(2),(Q)→(3),(R)→(4),(S)→(1)   (D) (P)→(3),(Q)→(3),(R)→(5),(S)→(5)

STATISTICS

Q. Median from the following distribution

Class	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30	30 – 35	35 – 40	40 – 45
frequency	5	6	15	10	5	4	2	2

is   cf   5   11✓   26   36   41   45   47   49

(A) 19.0   (B) 19.2   (C) 19.3   (D) 19.5

$$\frac{N}{2} = \frac{49}{2} = 24.5$$

$$M = l + \left(\frac{\frac{N}{2} - F}{f}\right) \times h = 15 + \left(\frac{24.5 - 11}{15}\right) \times 5$$

STATISTICS

Q. Mean deviation about mean from the following data :

x_i	3	9	17	23	27
f_i	8	10	12	9	5

is-

(A) 7.15   (B) 7.09   (C) 8.05   (D) None of these

$$\frac{\Sigma f_i x_i}{\Sigma f_i} = \frac{24 + 90 + 204 + 207 + 135}{44} = 15$$

$$MD = \frac{\Sigma f_i |x_i - M|}{\Sigma f_i} = \frac{96 + 60 + 24 + 72 + 60}{44}$$

STATISTICS

Q. The median for the following frequency distribution :

x:	1	2	3	4	5 ✓	6	7	8	9
f:	8	10	11	16	20	25	15	9	6

is: cf   8   18   29   45   ⟨65⟩   90   105   114   120

(A) 4   (B) 5   (C) 6   (D) None of these

$$\frac{N}{2} = \frac{\Sigma f}{2} = \boxed{60}$$

$$\boxed{M = 5}$$