Statistics

1. **Statement-1 :** The variance of first n even natural numbers is $\frac{n^2-1}{4}$.

   Statement-2 : The sum of first n natural numbers is $\frac{n(n+1)}{2}$ and the sum of squares of first n natural numbers is $\frac{n(n+1)(2n+1)}{6}$.

   [AIEEE-2009]

   (1) Statement-1 is true, Statement-2 is true; Statement-2 is ***not*** a correct explanation for Statement-1

   (2) Statement-1 is true, Statement-2 is false

   (3) Statement-1 is false, Statement-2 is true

   (4) Statement-1 is true, Statement-2 is true; Statement-2 is a correct explanation for Statement-1

2. If the mean deviation of the numbers 1, 1 + d, 1 + 2d, ..., 1 + 100d from their mean is 255, then the d is equal to **[AIEEE-2009]**

   (1) 20.0 (2) 10.1

   (3) 20.2 (4) 10.0

3. For two data sets, each of size 5, the variances are given to be 4 and 5 and the corresponding means are given to be 2 and 4, respectively. The variance of the combined data set is**[AIEEE-2010]**

   (1) $\frac{5}{2}$ (2) $\frac{11}{2}$

   (3) 6 (4) $\frac{13}{2}$

4. A scientist is weighing each of 30 fishes. Their mean weight worked out is 30 gm and a standard deviation of 2 gm. Later, it was found that the measuring scale was misaligned and always under reported every fish weight by 2 gm. The correct mean and standard deviation (in gm) of fishes are respectively **[AIEEE-2011]**

   (1) 28, 2 (2) 28, 4

   (3) 32, 2 (4) 32, 4

5. Let x_1, x_2 ..., x_n be n observations, and let $\bar{x}$ be their arithmetic mean and σ^2 be their variance.

   Statement-1: Variance of $2x_1$, $2x_2$, ..., $2x_n$ is 4 σ^2.

   Statement-2: Arithmetic mean of $2x_1$, $2x_2$, ..., $2x_n$ is 4 $\bar{x}$. **[AIEEE-2012]**

   (1) Statement-1 is true, statement-2 is true; statement-2 is a correct explanation for statement-1.

   (2) Statement-1 is true, statement-2 is true, statement-2 is **not** a correct explanation for statement-1.

   (3) Statement-1 is true, statement-2 is false.

   (4) Statement-1 is false, statement-2 is true.

6. All the students of a class performed poorly in Mathematics. The teacher decided to give grace marks of 10 to each of the students. Which of the following statistical measures will not change even after the grace marks were given? **[JEE (Main)-2013]**

   (1) Mean (2) Median

   (3) Mode (4) Variance

7. The variance of first 50 even natural numbers is **[JEE (Main)-2014]**

   (1) 437 (2) $\frac{437}{4}$

   (3) $\frac{833}{4}$ (4) 833

8. 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]**

   (1) 16.8 (2) 16.0

   (3) 15.8 (4) 14.0

9. If the standard deviation of the number 2, 3, a and 11 is 3.5, then which of the following is true? **[JEE (Main)-2016]**

   (1) $3a^2 - 32a + 84 = 0$ (2) $3a^2 - 34a + 91 = 0$

   (3) $3a^2 - 23a + 44 = 0$ (4) $3a^2 - 26a + 55 = 0$

10. 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, ..., x_9 is **[JEE (Main)-2018]**

(1) 9 (2) 4

(3) 2 (4) 3

11. 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) 18 (2) 20

(3) 22 (4) 16

12. A data consists of n observations x_1, x_2, ..., 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) $\sqrt{7}$ (2) 5

(3) $\sqrt{5}$ (4) 2

13. 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) 10 : 3 (4) 5 : 8

14. 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, ..., x_5 and –50 is equal to **[JEE (Main)-2019]**

(1) 586.5 (2) 582.5

(3) 509.5 (4) 507.5

15. 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) $\sqrt{2}$ (2) $\frac{\sqrt{5}}{2}$

(3) $\frac{2}{3}$ (4) 2

16. If the sum of the deviations of 50 observations from 30 is 50, then the mean of these observations is **[JEE (Main)-2019]**

(1) 31 (2) 30

(3) 50 (4) 51

17. The mean and the variance of five observations 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) 5 (2) 7

(3) 3 (4) 1

18. 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) 45 (2) 40

(3) 48 (4) 49

19. 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) $\frac{100}{\sqrt{3}}$ (2) $\frac{10}{\sqrt{3}}$

(3) $\frac{100}{3}$ (4) $\frac{10}{3}$

20. 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) $\sqrt{6}$ (2) $2\sqrt{6}$

(3) $2\sqrt{\frac{10}{3}}$ (4) $4\sqrt{\frac{5}{3}}$

21. 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) $\frac{7}{3}$ (2) $\frac{8}{3}$

(3) $\frac{7}{2}$ (4) $\frac{9}{4}$

22. 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) 3.2 (2) 3.0

(3) 2.5 (4) 2.8

23. If both the mean and the standard deviation of 50 observations $x_1, x_2, \ldots x_{50}$ are equal to 16, then the mean of $(x_1-4)^2, (x_2-4)^2, \ldots (x_{50}-4)^2$ is

[JEE (Main)-2019]

(1) 380 (2) 480

(3) 400 (4) 525

24. If the data $x_1, x_2, \ldots, x_{10}$ 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) $2\sqrt{2}$ (2) 4

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

25. 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) –10 (2) –20

(3) –5 (4) 10

26. 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) 3.98 (2) 4.02

(3) 3.99 (4) 4.01

27. 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]**

(1) (6, 3) (2) (3, 6)

(3) (3, 3) (4) (6, 6)

28. Let $X = \{x \in N : 1 \le x \le 17\}$ and $Y = \{ax + b : x \in X$ and $a, b \in R, a > 0\}$. If mean and variance of elements of Y are 17 and 216 respectively then $a + b$ is equal to **[JEE (Main)-2020]**

(1) 7 (2) –27

(3) 9 (4) –7

29. For the frequency distribution :

Variate (x) : $x_1 \quad x_2 \quad x_3 \ldots x_{15}$

Frequency (f) : $f_1 \quad f_2 \quad f_3 \ldots f_{15}$

where $0 < x_1 < x_2 < x_3 < \ldots < x_{15} = 10$ and

$\sum_{i=1}^{15} f_i > 0$, the standard deviation cannot be

[JEE (Main)-2020]

(1) 1 (2) 6

(3) 2 (4) 4

30. Let $x_i (1 \le i \le 10)$ be ten observations of a random variable X. If $\sum_{i=1}^{10}(x_i-p)=3$ and $\sum_{i=1}^{10}(x_i-p)^2=9$ where $0 \neq 0$ $p \in R$, then the standard deviation of these observations is **[JEE (Main)-2020]**

(1) $\frac{7}{10}$ (2) $\frac{9}{10}$

(3) $\sqrt{\frac{3}{5}}$ (4) $\frac{4}{5}$

31. The mean and variance of 8 observations are 10 and 13.5, respectively. If 6 of these observations are 5, 7, 10, 12, 14, 15, then the absolute difference of the remaining two observations is

[JEE (Main)-2020]

(1) 9 (2) 3

(3) 7 (4) 5

32. The mean and variance of 7 observations are 8 and 16, respectively. If five observations are 2, 4, 10, 12, 14, then the absolute difference of the remaining two observations is

[JEE (Main)-2020]

(1) 2 (2) 4

(3) 3 (4) 1

33. If the mean and the standard deviation of the data 3, 5, 7, a, b are 5 and 2 respectively, then a and b are the roots of the equation

[JEE (Main)-2020]

(1) $x^2 - 20x + 18 = 0$ (2) $2x^2 - 20x + 19 = 0$

(3) $x^2 - 10x + 18 = 0$ (4) $x^2 - 10x + 19 = 0$

34. If $\sum_{i=1}^{n}(x_i - a) = n$ and $\sum_{i=1}^{n}(x_i - a)^2 = na$, $(n, a > 1)$ then the standard deviation of n observations x_1, x_2, ..., x_n is **[JEE (Main)-2020]**

(1) a – 1 (2) $n\sqrt{a-1}$

(3) $\sqrt{n(a-1)}$ (4) $\sqrt{a-1}$

35. 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]**

36. If the mean and variance of eight numbers 3, 7, 9, 12, 13, 20, x and y be 10 and 25 respectively, then x.y is equal to _____. **[JEE (Main)-2020]**

37. If the variance of the terms in an increasing A.P., b_1, b_2, b_3, ..., b_{11} is 90, then the common difference of this A.P. is _____. **[JEE (Main)-2020]**

38. If the variance of the following frequency distribution

Class	:	10–20	20–30	30–40
Frequency	:	2	x	2

is 50, then x is equal to _____. **[JEE (Main)-2020]**

39. Consider the data on x taking the values 0, 2, 4, 8, ..., 2^n with frequencies ${}^nC_0$, ${}^nC_1$, ${}^nC_2$, ..., ${}^nC_n$ respectively. If the mean of this data is $\frac{728}{2^n}$, then n is equal to _____ . **[JEE (Main)-2020]**

❑ ❑ ❑