Statistics (Questions asked in JEE Mains 2020)

1. 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 $728/2^n$, then n is equal to _____.

2. 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 :

   (a) 400 (b) 380 (c) 525 (d) 480

3. If $\sum_{i=1}^{n}(x_i - a) = n \text{ and } \sum_{i=1}^{n}(x_i - a)^2 = na, (n, a > 1)$, then the standard deviation of n observation $x_1, x_2, \ldots\ldots x_n$ is

   (a) a -1 (b) $n\sqrt{a-1}$ (c) $\sqrt{n(a-1)}$ (d) $\sqrt{a-1}$

4. 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 :

   (a) 1 (b) 4 (c) 2 (d) 3

5. 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 :

   (a) $x^2 - 10x + 18 = 0$ (b) $2x^2 - 20x + 19 = 0$ (c) $x^2 - 10x + 19 = 0$ (d) $x^2 - 20x + 18 = 0$

6. 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 :

   (a) 9 (b) 5 (c) 3 (d) 7

7. If a variance of the following frequency distribution :

Class	10-20	20-30	30-40
Frequency	2	x	2

is 50, then x is equal to _____.

8. For the frequency distribution:

Variate (x) :	x_1	x_2	$x_1 \ldots x_{15}$
Frequency (f) :	f_1	f_2	$f_3 \ldots f_{15}$

where $0 < x_1 < x_2 < x_3 < \ldots < x_{15} = 10$ and $\sum_{i=1}^{15} f_1 > 0$, the standard deviation **cannot** be

   (a) 4 (b) 1 (c) 6 (d) 2

9. 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 $0 \ne p \ne \in R$, then the standard deviation of these observations is :

   (a) $\sqrt{\frac{3}{5}}$ (b) 4 / 5 (c) 9 /10
   (d) 7 / 10

10. Let $X = \{x \in N : 1 \le x \le 17\}$ and $Y = \{ax + b : x \in X \text{ and } a, b \in T, a > 0\}$. If mean and variance of elements of *Y*

are 17 and 216 respectively then *a* + *b* is equal to :

(a) 7 (b) –7 (c) –27 (d) 9

11. 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 _____.

12. Let the observations $x_i (1 \le i \le 10)$ satisfy the equations, $\sum_{i=10}^{10}(x_i - 5) = 10$ *and* $\sum_{i=1}^{10}(xi - 5)^2 = 40$ If *a*, and *b* are the mean and the variance of the observations, $x_1 - 3$, $x_2 - 3$, ..., $x_{10} - 3$, then the ordered pair (*a*, *b*) is equal to:

(a) (3, 3) (b) (6, 3) (c) (6, 6) (d) (3, 6)

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* □□0 and *q* □ 0. If the new mean and new s.d.

become half of their original values, then *q* is equal to:

(a) -5 (b) 10 (c) -20 (d) -10

14. 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:

(a) 3.99 (b) 4.01 (c) 4.02 (d) 3.98

15. 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 _____.

16. 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 _____.

17. If the data $x_1, x_2, \ldots\ldots, x_{10}$ 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 :

(a) $2\sqrt{2}$ (b) 2 (c) 4 (d) $\sqrt{2}$

Answer key

1.(6.00) 2.(a) 3.(d) 4.(c) 5.(c) 6.(d) 7.(4) 8.(c) 9.(c) 10.(b) 11.(3) 12.(a) 13.(c) 14.(a) 15.(18) 16.(52) 17.(b)