

Q1:- Which of the following options is true for correlation coefficient ρ ?

Ans:- $-1 \leq \rho \leq 1$

Q2:- Karl Pearson's correlation coefficient is given by which of the following options?

Ans:- $\text{cov}(x,y)/\sqrt{(\text{var}(x)\text{var}(y))}$

Q3:- Which of the following options is correct? (Here $r(X,Y)$ is the Karl Pearson's correlation coefficient)

If $r(x,y)=0$ then X and Y are independent

If x and y are independent then $r(x,y)=0$

Ans:- both option (i) and (ii)

Q4:- Which of the following options is correct?

$\text{Cov}(x,y) = 1/n \sum x_i y_i - \bar{x} \bar{y}$

$\text{Var}(x) = 1/n [\sum x_i^2 - n \bar{x}^2]$

Ans:- option (i) only

Q5:- Which of the following options is correct? (Here $r(X,Y)$, $b(x,y)$ and $b(y,x)$ are correlation and regression coefficients)

Ans:- $r(x,y)$ is geometric mean of $b(x,y)$ and $b(y,x)$

Q6:- Which of the following options is correct? (Here $r(X,Y)$ is the Karl Pearson's correlation coefficient)

Ans:- If $r(x,y)=0$ then the regression lines are perpendicular

Q7:- To fit a non linear curve $Y=a+bx+cx^2$ to a given data the number of normal equations required is:

Ans:- 3

Q8:- To fit a linear curve $y=a+bx$ to a data, which of the following sums is not required?

Ans:- $\sum y^2$

Q9:- While calculating Rank correlation coefficient in case of repeated ranks, if a rank is repeated '3' times then which of the following corrections is added to $\sum d_i^2$? (d_i is the difference between the ranks)

Ans:- 2

Q10:- If $U=(x-3)/4$ and $V=(Y-4)/3$ then which of the following options is correct? (Here $\text{Cov}(x,y)$ is covariance between x and y)

Ans:- $\text{cov}(x,y) = 12 \text{cov}(u,v)$

Q11:- If $U=(x-3)/4$ then which of the following options is correct? (Here $\text{var}(x)$ and $\text{var}(u)$ is variance in x and u)

Ans:- $\text{var}(x) = 16 \text{var}(u)$

Q12:- If $x_1, x_2, x_3, \dots, x_n$ is a random sample drawn from a population then which of the following is an unbiased estimator of population mean?

Ans:- $1/n \sum x_i$

Q13:- If $x_1, x_2, x_3, \dots, x_n$ is a random sample of size n from a normal population with population mean μ and population standard deviation σ then $t = 1/n \sum x_i^2$ is an unbiased estimator of

Ans:- $\sigma^2 + \mu^2/n$

Q14:- If $\text{var}(t_1) = \sigma^2/5, \text{var}(t_2) = 3\sigma^2/5, \text{var}(t_3) = \sigma^2/2$ then efficiency of t_2 is

Ans:- $1/3$

Q15:- If $x_1, x_2, x_3, \dots, x_n$ is a random sample from a population having Bernoulli distribution with parameter ' θ ' and $T = \sum x_i$, then $\text{var}(T)$ is:

Ans:- $n\theta(1-\theta)$

Q16:- A sequence of estimators $\{T_n\}$ where $n=1, 2, 3, \dots$ is a consistent estimator of a parameter ' θ ' if:

Ans:- $E(T_n) = \theta \rightarrow V(T_n) \rightarrow 0$ as $n \rightarrow \infty$

Q17:- If $x_1, x_2, x_3, \dots, x_n$ is a sample drawn from a population with population mean ' μ ' then which of the following is correct:

Ans:- $E(x_i) = \mu$

Q18:- If $x_1, x_2, x_3, \dots, x_n$ is a sample drawn from a population with sample mean \bar{x} and population mean μ then which of the following is correct?

Ans:- $E(\bar{x}) = \mu$

Q19:- If $x_1, x_2, x_3, \dots, x_n$ is a sample drawn from a population with population variance σ^2 and population mean μ then which of the following is correct

Ans:- $V(x_i) = \sigma^2$

Q20:- If $x_1, x_2, x_3, \dots, x_n$ is a random sample from a population having Bernoulli distribution with parameter θ then $\sum x_i/n$ is a consistent estimator of which of the following?

Ans:- θ

Q1:- The 6th moment of a r.v. about a point $x=a$ is:

Ans:- $E[(x-a)^6]$

Q2:- If u_r is the r th moment of a r.v. about the point $x=0$ then which of the options are correct :

$$U_3' = M_x'''(0)$$

U_r' = the coefficient of $t^r/r!$ in the expansion of MGF $M_x(t)$

Ans:- both option (i) and (ii)

Q3:- A random variable ' x ' has the following probability function:

$X=x$	0	1	2
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$P(x) \quad 1/6 \quad 1/2 \quad 1/3$
Then $E(x)=?$

Ans:- $7/6$

Q4:- If $F(x)$ is the distribution function and $f(x)$ is the pdf of a continuous random variable x , then which of the following is correct?

Ans:- Derivative of $F(x)$ is equal to $f(x)$

Q5:- The moment generating function (about origin) of discrete random variable x with $f(x)$ as pmf is given by

Ans:- $\sum_{-\infty}^{\infty} t^x f(x)$

Q6:- Which of the following is correct?

Ans:- $E(3x+4)=3E(x)+4$

Q7:- Which of the following is correct?

Ans:- $V(x)=E(x^2)-[E(x)]^2$

Q8:- A continuous random variable x has pdf $f(x)=6x^2(1-x^3), 0 < x < 1$. Then value of $P[x=1/2]=p=?$

Ans:- 0 (at any single point probability = 0)

Q9:- If the r th moment of a discrete r.v. about the origin are equal to 0.6 for $r=1,2,3,\dots$ then $P(x=3)=?$

Ans:- 0

Q10:- A box contains 6 gold and 4 silver coins. 2 coins are chosen at random simultaneously. Then the expectation of the number of gold coins is:

Ans:- $6/5$

Q11:- 4 dice are rolled simultaneously. Then the expectation of the sum of numbers on the upturned faces is:

Ans:- 14

Q12:- Covariance between two random variables X and Y is given by: $\text{cov}(x,y)=E[\{x-E(x)\}\{y-E(y)\}]$. Then $\text{cov}(x+4,y+3)=?$

Ans:- $\text{cov}(x,y)$

Q13:- if $\text{mean}(x)=2$ and $\text{variance}(x)=9$ then $E(x-2/3)=?$

Ans:- 0

Q14:- if x is a binomial variate with parameter p such that $n=5$ and $p(x=0)=p(x=1)$, Then $p=?$

Ans:- $1/6$

Q15:- if the pmf of rv is $P(x=k)=qp^{k-1}; k=1,2,3,\dots$ then MGF of the r.v (about origin) is:

Ans-: $pe^t/1-qe^t$

Q16-: Covariance between two random variable x and y is given by: $\text{cov } E[\{x-E(x)\} \{y-E(y)\}]$.
If x_1 and x_2 are two random variables then $V(3x_1+2x_2)=?$

Ans-: $9v(x_1)+4v(x_2)+12\text{cov}(x_1,x_2)$

Q17-: If the pmf of a r.v is $p(x=k)=qp^k; p+q=1; k=1,2,3,\dots$. Then expectation of x is:

Ans-: p/q