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Statistics 2 Exam

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Education qualification.

Exam

1) If X, Y are two independent random variables. Then what is the expectation of XY denoted as E(XY) is?

- 0
- 1
- E(X)*E(Y)
- 2*E(X)*E(Y)
- None of the above

2) The covariance of two independent random variables X, Y is?

- 0
- 1
- E(XY)
- E(XY)- E(X)*E(Y)

3) If X and Y are random variables with variances Var(X) = 2 and Var(Y) = 4 and covariance Cov(X,Y) = −2, what is the variance of the random variable Z = 3X − 4Y + 8?

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4) A random variable X has a mean μ = 8, a standard deviation σ = 4, and an unknown probability distribution. The value of P(-4<x<20) according to Chebyshev's theorem can be?

- [ ] 0.6

- [ ] 0.7
- [x] 0.8
- [ ] 0.9
- [ ] 0.99

5) In a binomial distribution of tossing a coin if the probability of getting a toss tends to zero, then which of the following is true

- ( ) Variance tends to zero
- ( ) Variance tends to one
- ( ) Doesn't change
- (•) Variance increases

6) In a biased coin, the probability of getting tails and heads is 0.4 and 0.6 respectively. What is the expected number of independent trials required to get the first tails?

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7) Which of the following statements are true regarding the normal distribution of two curves of mean and standard deviation values as μ1, μ2 and σ1, σ2 respectively.

- [ ] If μ1 = μ2, σ1 != σ2 then both have the same curve.
- [ ] if σ1 = σ2 and μ1 = μ2, then both have the same curve.
- [ ] if σ1 = σ2 and μ1 != μ2, then both curves are identical but are centered at different positions.
- [ ] If μ1 = μ2, σ1 > σ2 then both curves are centered at same point in x-axis but the spread of curve 1 is greater than spread of curve 2

- [ ] If μ1 = μ2, $\sigma 1 < \sigma 2$ then both curves are centered at same point in x-axis but the spread of curve 1 is greater than spread of curve 2

8) The central limit theorem is only applicable when:

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10) The smartphone manufacturer A has a mean lifetime of 6.5 years and a standard deviation of 0.9 years, while those of manufacturer B has a mean lifetime of 6.0 years and a standard deviation of 0.8 years. What is the probability that a random sample of 36 smartphones from manufacturer A will have a mean lifetime that is at least 1 year more than the mean lifetime of a sample of 49 smartphones from manufacturer B? Use the standard normal distribution values if required : P(Z>2.55)=0.99379, P(Z>2.65)=.996, P(Z>2.75)=0.997, P(Z>3)=0.9986

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11) The average zinc concentration recovered from a sample of measurements taken in 36 different locations in a river is found to be 2.6 grams per milliliter. Find the 95% confidence interval for the mean zinc concentration in the river. Assume that the population standard deviation is 0.3 gram per milliliter. Use, if required, standard normal distribution value P(Z>1.96)=0.025

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12) In hypothesis testing, the significance level is set to 5%. If the p-value is 3%. Then which of the following is true?

- [ ] Null hypothesis assumption is accepted
- [ ] Null hypothesis assumption is rejected

- [ ] Alternate hypothesis assumption can be accepted
- [ ] Alternate hypothesis assumption is rejected

13) Which of the following is a type II error in hypothesis testing?

- ( ) Accepting the null hypothesis when it should be accepted
- ( ) Accepting the null hypothesis when it should be rejected
- ( ) Rejecting the null hypothesis when it should be rejected
- ( ) Rejecting the null hypothesis when it should be accepted

14) The government in a town claims that 45% of the people have income higher than INR 12 lakh. The media believes that it is less than 45%. To test the hypothesis of the government, the media collected a random sample of 100 people and found that 40% of people have income less than INR 12 lakh. Based on this data, should we reject or accept the null hypothesis? Please enter the p-value and give the reason for rejecting or not rejecting the null hypothesis. (Governments' claim) if the significance level is 5%? Use the standard normal distribution table - https://www.math.arizona.edu/~rsims/ma464/standardnormaltable.pdf

15) Mumbai Indians team from IPL claimed that they have conceded an average first innings score of 175 runs to the opposite teams in IPL matches. Rahul believed that first innings score to be more than 175 runs, to test the hypothesis he collected a random sample of 30 matches Mumbai Indians team played and found that mean and standard deviation of the sample is 185 runs and 30 runs respectively. The significance level(**α**) is 5%. Assume all the conditions for the interference were met. Based on this data compute and enter the p-value and also comment on whether the null hypothesis is rejected or not. Use the following link for t-table if required: https://www.sjsu.edu/faculty/gerstman/StatPrimer/t-table.pdf

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