Assignment 10

The due date for submitting this assignment has passed. Due on 2019-04-10, 23:59 IST.
As per our records you have not submitted this assignment.

1) Let $X_1, \ldots, X_n$ be a random sample from Bernoulli distribution with parameter $p$, $0 < p < 1$.
Consider the estimator as $T_1 = X_1$, $T_2 = \frac{1}{n} \sum_{i=1}^{n} X_i$, and $T_3 = \frac{2}{n(n+1)} \sum_{i=1}^{n} X_i$. Which among the following statements is true?

a. $T_1$ is better than $T_2$ and $T_3$.

b. $T_2$ is better than $T_1$ and $T_3$.

c. $T_3$ is better than $T_1$ and $T_2$.

d. $T_3$ is a biased estimator.

No, the answer is incorrect.
Score: 0
Accepted Answers: d.

2) In Question 1, which of the following is a sufficient statistic?

a. $\sum_{i=1}^{n} X_i$

b. $\sum_{i=1}^{n} \log(X_i)$

c. $\sum_{i=1}^{n} X_i^2$

d. $\prod_{i=1}^{n}(1-X_i)$

a. b. c.
3) Let $X_1, \ldots, X_n$ be a random sample from Poisson distribution with parameter $\lambda$. Find complete and sufficient statistics for the family of distributions.

- a. $\sum_{i=1}^{n} X_i^2$
- b. $(X_1 + X_2 + \ldots + X_n)$
- c. $\sum_{i=1}^{n} X_i$
- d. $\frac{1}{n} \prod_{i=1}^{n} X_i$

No, the answer is incorrect.
Score: 0
Accepted Answers:
- c.

4) Let $X_1, \ldots, X_n$ be a random sample from $U(0, \theta)$, $\theta > 0$. Let $X_{(0)} = \min(X_1, \ldots, X_n)$ and $X_{(n)} = \max(X_1, \ldots, X_n)$. Which among the following statement is not true?

- a. $X_{(0)}$ is complete and sufficient.
- b. $\left( \frac{n+1}{n} \right)^2 X_{(0)}$ is UMVUE
- c. $\left( \frac{n+1}{n} \right) X_{(0)}$ is consistent
- d. $\frac{X_{(n)}}{n}$ is consistent

No, the answer is incorrect.
Score: 0
Accepted Answers:
- d.

5) Let $X_1, \ldots, X_n$ be a random sample from binomial $(k, p)$, where $k$ is known and $0 < p < 1$. Using Rao-Blackwell theorem, find an unbiased estimator to estimate the probability of one success.
Ten laboratory determinations of the value of $g$, the acceleration due to gravity at Kolkata, a mean 978.27 cm/sec$^2$ and a standard deviation 4.34 cm/sec$^2$. Now it is known that the population of the measured values of any physical quantity subject to experimental errors normal distribution whose mean is the true value of the quantity. Assuming this fact, find confidence interval for the true value of $g$.

- a. (975.22, 981.33)
- b. (975.05, 981.49)
- c. (975.58, 980.96)
- d. (975.17, 981.90)
7) The population of scores of 10 year old children in a psychological performance test is known to have a normal distribution with standard deviation 4.7. If a random sample of size 15, has a mean of 17.3, find a 95% confidence interval for the mean score of the population.

a. (14.70, 19.90)
b. (14.92, 19.67)
c. (14.61, 19.99)
d. (14.71, 19.89)

No, the answer is incorrect.

8) If 31 measurements of boiling point of Sodium have a standard deviation 0.40°C, construct a 95% confidence interval for the standard deviations of such measurements.

a. (0.3496, 0.5946)
b. (0.3196, 0.5946)
c. (0.3496, 0.5346)
d. (0.3196, 0.5346)

No, the answer is incorrect.

9) From a lot of manufactured bolts produces by two companies, samples are taken from companies. The diameter of a bolt in cm are measured as $n_1=10$, $\overline{x}_1=1.56$, $s_1^2=0.48$ $n_2=15$, $\overline{x}_2=1.13$, $s_2^2=0.36$. Obtain 95% confidence intervals for the difference of population means assuming that the unknown population variance are equal.

a. (0.5, 0.96)
b. (-0.5, 0.48)
c. (-0.1, 0.96)
d. (0.5, 0.48)
A random sample of size 50 has variance 4. Find the maximum error in estimating the mean with 95% confidence.

<table>
<thead>
<tr>
<th>Options</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>1.108</td>
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<tr>
<td>b.</td>
<td>0.554</td>
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<tr>
<td>c.</td>
<td>0.678</td>
</tr>
<tr>
<td>d.</td>
<td>0.322</td>
</tr>
</tbody>
</table>

No, the answer is incorrect.

Score: 0
Accepted Answers: d.