Unit 5 - Week 3

Assignment 3

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2019-02-20, 23:59 IST.

1) Let the moment generating function of a random variable \( X \) be given by

\[
M_X(t) = \frac{e^t}{3-2e^t}, \quad t < \log_3(2).
\]

Then \( \mu(X) \) is equal to

- a. 6
- b. 4
- c. 3
- d. 2

No, the answer is incorrect.

Score: 0

Accepted Answers:
- a

2) A discrete random variables \( X \) has the following probability mass function

\[
\begin{array}{c|ccccc}
X & 0 & 1 & 2 & 3 & 4 & 5 \\
\hline
P(X = x) & \frac{2}{11} & \frac{3}{11} & \frac{2}{121} & \frac{4}{11} & \frac{20}{121} & \end{array}
\]

Determine the standard deviation of \( X \).

- a. 1.07
- b. 1.42
- c. 2.02
- d. 3.56

No, the answer is incorrect.

Score: 0

Accepted Answers:
- a
If $X$ is a continuous random variable with probability density function given by

$$f_X(x) = \begin{cases} ax, & -2 < x < 0 \\ bx, & 0 \leq x < 2 \\ 0, & \text{otherwise} \end{cases}$$

Let $E(X) = \frac{4}{3}$. Find the median of $X$.

- a. $1$
- b. $-1$
- c. $\frac{1}{\sqrt{2}}$
- d. $\sqrt{2}$

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

4)

If a fair dice is tossed 3000 times, the tosses being independent of each other. Use Chebyshev inequality to find a lower bound for the probability that the number of ‘1s’ observed is between 470 and 530.

- a. 0.462
- b. 0.537
- c. 0.232
- d. 0.768

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

5)
A random point $P$ is taken on a line segment $AB$ of length $2a$. Find the expected value of $\max(4P, PB)$.

a. $\frac{3a}{2}$
b. $\frac{a}{2}$
c. $\frac{3a}{4}$
d. $\frac{a}{4}$

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

6) For a certain job, a candidate is sending many applications. He/she estimates there is a chance that an application will be successfully accepted. How many applications should he/she send out so that the probability of at least one acceptance is at least 95%?

a. 4
b. 6
c. 8
d. 9

No, the answer is incorrect.
Score: 0
Accepted Answers: d
The installation time, in hours, for a certain software module has pdf

\[ f(x) = \begin{cases} 
  k(1-x^2), & 0 < x < 1 \\
  0, & \text{otherwise.} 
\end{cases} \]

The value of \( Var(X) \) is

a. \( \frac{7}{225} \)
b. \( \frac{11}{225} \)
c. \( \frac{14}{225} \)
d. \( \frac{21}{225} \)

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

8) An electronic store has twenty TV sets. Five of these have some manufacturing defect. A cust randomly selects four TV sets. Find the probability that the sample will have exactly one def (approximately).

a. 0.81
b. 0.72
c. 0.47
d. 0.35

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

9) Let \( X \) follow a Binomial distribution with mean 8 and standard deviation 2. Find \( P(X \geq 3) \).

a. 0.0021
b. 0.3652
c. 0.7396
d. 0.9979

No, the answer is incorrect.
Consider the probability density function

\[ f_X(x) = \begin{cases} \frac{1}{\alpha^2} \left(1 - \frac{|x - \theta|}{\alpha^2}\right), & |x - \theta| \leq \alpha^2, \\ 0, & \text{otherwise} \end{cases} \]

Find the median and variance of \( X \).

a. \( \theta \) and \( \frac{\alpha^4}{6} \)

b. \( \theta \) and \( \frac{\alpha^2}{6} \)

c. \( \frac{\theta}{2} \) and \( \frac{\alpha^4}{6} \)

d. \( \frac{\theta}{2} \) and \( \frac{\alpha^2}{6} \)