Assignment 3

The due date for submitting this assignment has passed. You do not need to submit this assignment.

Let \( X_1, X_2, ..., X_n \) be random variables distributed as \( N(0,1) \), then what is the distribution of \( \sum_{k=1}^{n} X_k^2 \)?

- \( N(0,1) \)
- \( N(1,1) \)
- \( N(n,1) \)
- \( N(n, n) \)

Accurately answered.

Consider the following pairs of random variables with varying degrees of freedom (in the vertical box).

- \( X \sim N(0,1) \) (Normal distribution)
- \( X \sim t(1) \) (Student's t-distribution)
- \( X \sim F(2,3) \) (F-distribution)
- \( X \sim \chi^2(2) \) (Chi-square distribution)
- \( X \sim \beta(2,3) \) (Beta distribution)

The correct order of increasing degrees of freedom is (Beta, F, Student’s t, Normal, Chi-square).

- Beta, F, Student’s t, Normal, Chi-square
- Beta, Student’s t, F, Normal, Chi-square
- Student’s t, Beta, F, Normal, Chi-square
- Student’s t, Beta, Normal, F, Chi-square

Accurately answered.

Let \( X, Y, Z \) be independent random variables with \( X \sim N(0,1), Y \sim F(1,2), Z \sim t(3) \). Then, what is the distribution of \( X+Y+Z \)?

\( N(0,1) \)
\( N(1,1) \)
\( N(3,3) \)
\( N(1,2) \)

Accurately answered.

Let \( X, Y, Z \) be independent random variables with \( X \sim N(0,1), Y \sim F(1,2), Z \sim t(3) \). Then, what is the distribution of \( X+Y-Z \)?

\( N(0,1) \)
\( N(1,1) \)
\( N(2,2) \)
\( N(0,2) \)

Accurately answered.

Suppose you go to the bank to make a deposit and you usually try to find \( x \) or a customer ahead of you. The time of service for these customers is an exponentially distributed with parameter \( \lambda \), which is the rate of your service (m/s).

\[ f(x) = \lambda e^{-\lambda x} \]

Accurately answered.

You live in a school district with 5,000 high school students. In this district, the average weight of a male student is 160 pounds with a standard deviation of 20 pounds. Suppose you chose a random sample of 15 students. What is the probability that the average weight of this sample student will be less than 150 pounds?

\[ P(\bar{X} < 150) = \Phi \left( \frac{150 - 160}{20/\sqrt{15}} \right) \]

Accurately answered.

You live in the city of New York, where the annual rainfall is normally distributed with a mean of 40 inches and a standard deviation of 8 inches. What is the probability that the annual rainfall in your city is between 35 and 45 inches?

\[ P(35 < X < 45) = \Phi \left( \frac{45 - 40}{8/\sqrt{12}} \right) - \Phi \left( \frac{35 - 40}{8/\sqrt{12}} \right) \]

Accurately answered.

Let \( X \) be a standard normal variable. What is the distribution of \( X^2 \)?

\( N(1,1) \)
\( N(0,1) \)
\( N(0, n) \)
\( N(0, 2n) \)

Accurately answered.

Suppose you own a taxi service and you receive a request to pick up a passenger at a random time from 7 AM to 9 AM. What is the probability that the request arrives within the first hour?

\[ P(0 < X < 1) = \frac{1}{2} \]

Accurately answered.

Consider the following pairs of random variables with varying degrees of freedom (in the vertical box).

- \( X \sim N(0,1) \) (Normal distribution)
- \( X \sim F(1,2) \) (F-distribution)
- \( X \sim N(0,1) \) (Normal distribution)
- \( X \sim t(3) \) (Student's t-distribution)
- \( X \sim \chi^2(2) \) (Chi-square distribution)

The correct order of increasing degrees of freedom is (Normal, F, Normal, Student's t, Chi-square).

- Normal, F, Normal, Student's t, Chi-square
- Normal, F, Student's t, Normal, Chi-square
- F, Normal, Student's t, Normal, Chi-square
- Student's t, Normal, F, Normal, Chi-square

Accurately answered.

Let \( X \sim N(0,1) \) and \( Y \sim F(1,2) \). Then, what is the distribution of \( X+Y \)?

\( N(0,1) \)
\( N(1,1) \)
\( N(3,3) \)
\( N(2,2) \)

Accurately answered.

Due on 2020-02-19, 23:59 IST.