Engineering Mathematics II (ED 121)

Homework 3

Release Date: 23.01.2024
Due Date: 28.01.2021

1. If X has a uniform distribution on the interval from 0 to 10, then what is
$$P(X + \frac{10}{X} \geq 7)?$$

2. Evaluate $= \Gamma(\frac{7}{2})$

3. If the value of random variable is 2, mean is 5 and the standard deviation is 4, then find the probability density function of the gaussian distribution.

4. For some computers, the time period between charges of the battery is normally distributed with a mean of 50 hours and a standard deviation of 15 hours. Rohan has one of these computers and needs to know the probability that the time period will be between 50 and 70 hours.

5. The lifetime in hours of an electronic tube is a random variable having a probability density function given by
$$f(x) = xe^{-x} \quad x \geq 0$$
Compute the expected lifetime of such a tube.

6. Let X be a random variable with probability density function
$$f(x) = \begin{cases} c\left(1 - x^2\right) & -1 < x < 1 \\ 0 & \text{otherwise} \end{cases}$$
(a) What is the value of c ? (b) What is the cumulative distribution function of X ?

7. Consider the function
$$f(x) = \begin{cases} C\left(2x - x^3\right) & 0 < x < \frac{5}{2} \\ 0 & \text{otherwise} \end{cases}$$
Could f be a probability density function? If so, determine C. Repeat if $f(x)$ were given by
$$f(x) = \begin{cases} C\left(2x - x^2\right) & 0 < x < \frac{5}{2} \\ 0 & \text{otherwise} \end{cases}$$

8. A man aiming at a target receives 10 points if his shot is within 1 inch of the target, 5 points if it is between 1 and 3 inches of the target, and 3 points if it is between 3 and 5 inches of the target. Find the expected number of points scored if the distance from the shot to the target is uniformly distributed between 0 and 10.