

CS 206 - Introduction to Discrete Structures II

October 21, 2016

Homework: 6

Due Date: Friday, October 28 (3:00 pm)

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Assignment 1:

Let X be a random variable with probability density function

$$f(x) = \begin{cases} c(1 - x^2) & -1 < x < 1 \\ 0 & \text{otherwise} \end{cases} .$$

1. What is the value of c ?
2. What is the cumulative distribution function of X ?

Assignment 2:

The probability density function of X , the lifetime of a certain type of electronic device (measured in hours), is given by

$$f(x) = \begin{cases} \frac{10}{x^2} & x > 10 \\ 0 & x \leq 10 \end{cases} .$$

1. Find $\Pr(X > 20)$.
2. What is the cumulative distribution function of X ?
3. What is the probability that, of 6 such types of devices, at least 3 will function for at least 15 hours? What assumptions are you making?

Assignment 3:

Compute $E[X]$ if X has a density function given by

1.

$$f(x) = \begin{cases} \frac{1}{4}xe^{-x/2} & x > 0 \\ 0 & \text{otherwise} \end{cases} .$$

2.

$$f(x) = \begin{cases} \frac{5}{x^2} & x > 5 \\ 0 & x \leq 5 \end{cases} .$$