Assignment No. 3

CPE251 Probability Methods in Engineering

Spring 2025

Student Name: _____

Registration Number: _____

Marks Obtained: _____

Total Marks: 20

Assignment Date: Friday May 16, 2024

Due Date: Thursday May 22, 2024

Resource Person

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Problem 1 (CLO2) **(10)**

Continuous random variable X has PDF

$$fX(x) = f(x) = \begin{cases} \frac{1}{4} & -1 \le x \le 3, \\ 0, & otherwise. \end{cases}$$

Define the random variable Y by $Y = h(X) = X^2$

(a) Find $E[X]$ and Var$[X]$.
(b) Find $h(E[X])$ and $E[h(X)]$.
(c) Find $E[Y]$ and Var$[Y]$.

Solution

Problem 2 (CLO2) **(10)**

The probability density function (PDF) of a random variable X is,

$$fX(x) = f(x) = \begin{cases} \frac{1}{2}\, e^{-x/2} & x \geq 0, \\ 0, & otherwise. \end{cases}$$

Find the following:

(a) P[$1 \leq X \leq 2$]
(b) The CDF, $F_X(x)$
(c) The expected value, E[X]
(d) Variance, VAR[X]

Solution