ELEG 3143 Assignment # 6

1. A random variable has a cumulative distribution function (CDF) given by

$$F_X(x) = \begin{cases} 0, & x \leq -1 \\ 0.5 + 0.5x, & -1 < x \leq 1 \\ 1, & x > 1 \end{cases}$$

   (a) Find the probability that $X > 0.75$.

   (b) Find the probability that $-0.5 < X \leq 0.5$

   (c) Find the probability that $-1.5 < X \leq -0.5$

2. A random variable has a CDF given by

$$F_X(x) = \begin{cases} A\left[1 - e^{-(x-1)}\right], & x > 1 \\ 0, & x \leq 0 \end{cases}$$

   (a) Find the value of A that make it a proper CDF.

   (b) What is $F_X(2)$?

   (c) Find the probability that $1 < X \leq 3$.

3. A random variable has a CDF given by

$$F_X(x) = \begin{cases} A\left[1 - e^{-(x-1)}\right], & x > 1 \\ 0, & x \leq 1 \end{cases}$$

   (a) Find the probability density function (pdf).

   (b) Using the pdf, find the probability that $4 < X \leq 7$.

4. Let X be an RV wit the pdf given by

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

(a) What is the value of c?

(b) Find the CDF of x.

(c) Find the probability that $0.5 < X \leq 2$.