CS 333202: Probability and Statistics
HW7 Part II

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

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

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

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

2. Let f be the probability density function of a random variable X. In terms of f, calculate the probability density function of X^2.

3. A random variable X has the density function

$$f(x) = \begin{cases} 3e^{-3x} & \text{if } 0 \leq x < \infty \\ 0 & \text{otherwise} \end{cases}$$

   Calculate $E[e^X]$.