

Exercises Series N^03

Exercise 0.1. Let X be a random variable with PDF given by:

$$f_X(x) = \begin{cases} cx^2 & \text{for } |x| \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

1. Find the constant c .
 2. Find $E[X]$ and $Var(X)$.
 3. Find $p(X \geq \frac{1}{2})$
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Exercise 0.2. Let X be a continuous random variable with PDF given by:

$$f_X(x) = \frac{1}{2}e^{-|x|}. \quad \text{for all } x \in IR$$

1. If $Y = X^2$, find the CDF of Y ;
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Exercise 0.3. Let X be a continuous random variable with PDF :

$$f_X(x) = \begin{cases} 4x^3 & \text{for } 0 < x \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

Find $p(X \leq \frac{2}{3} / X > \frac{1}{3})$

Exercise 0.4. Let X be a continuous random variable with PDF :

$$f_X(x) = \begin{cases} x^2(2x + \frac{3}{2}) & \text{for } 0 < x \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

If $Y = \frac{2}{X} + 3$, find $Var(Y)$;

Exercise 0.5. Let X be a positive continuous random variable. Prove that $E[X] = \int_0^{+\infty} P(X \geq x)dx$
