MATH40005

Topic: Expectation of random variables

In today's problem class we will be computing expectations of various discrete and continuous random variables.

- 1. Compute the mean of the following random variables.
 - (a) $X \sim \operatorname{Poi}(\lambda)$,
 - (b) $X \sim \operatorname{Exp}(\lambda)$,
- 2. Let X be a continuous random variable with the following p.d.f.:

$$f_X(x) = \begin{cases} \theta \lambda e^{-\lambda x}, & x \ge 0; \\ (1-\theta)\lambda e^{\lambda x}, & x < 0. \end{cases}$$

where λ and θ are constants such that $\lambda > 0$ and $0 \le \theta \le 1$.

- (a) Show that $f_X(x)$ is a valid p.d.f..
- (b) Find E(X). *Hint: You might find it useful to look up the definition of the Gamma function.*
- (c) Find Var(X)