Homework 2

9/6/22

Homework 2 is due 9/16/2022 at 11:59 PM. Submit your homework on Canvas as one PDF document.

The PDF version of this assignment can be found here.

1. X is a random variable with the following pdf $f(x) = \frac{2x}{\pi^2}$ for $x \in [0, \pi]$, show that the pdf is valid.

2. $X \sim Pois(\lambda)$, what is the moment generating function of $Y = \log(X + 4)$?

3. Let X be a discrete random variable with PMF

$$P(X = x) = \begin{cases} 0.25 + 0.5e^{-\theta} & x = 0 \\ 0.25 + 0.5\theta e^{-\theta} & x = 1 \\ 0.5\frac{\theta^x}{x!}e^{-\theta} & x = 2, 3, ... \\ 0 & \text{otherwise} \end{cases}$$

   Show that the PMF is valid.

4. Let Y be random variable with support $(0, 1)$. What is the normalizing constant c to make $f(x) = cx$ valid?