ECS 315: In-Class Exercise # 12 - Sol

Instructions

1. Separate into groups of no more than three students each.
2. Write down all the steps that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.
3. **Do not panic.**

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Name	ID (last 3 digits)	
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Consider a random variable whose pmf is given by $p_X(x) = \begin{cases} \dfrac{1}{4}, & x = 1,9, \\ c, & x = 5, \\ 0, & \text{otherwise.} \end{cases}$
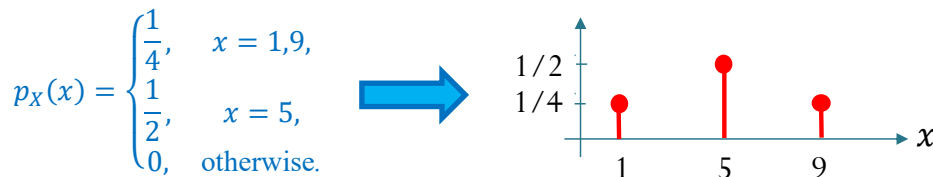
a) Find the constant c.

Recall that, for any pmf, $\sum_x p_X(x) = 1$. Therefore, we must have
$$p_X(1) + p_X(5) + p_X(9) = 1$$

$$\frac{1}{4} + c + \frac{1}{4} = 1$$
$$c = \frac{1}{2}.$$

b) Plot $p_X(x)$. (Recall that we use stem plot for pmf.)

$$p_X(x) = \begin{cases} \dfrac{1}{4}, & x = 1,9, \\ \dfrac{1}{2}, & x = 5, \\ 0, & \text{otherwise.} \end{cases}$$

c) Find $P[X \le 7]$.

$$P[X \le 7] = p_X(1) + p_X(5) = \frac{1}{4} + \frac{1}{2} = \frac{3}{4}.$$

d) Find $P[X > 4]$.

$$P[X > 4] = p_X(5) + p_X(9) = \frac{1}{2} + \frac{1}{4} = \frac{3}{4}.$$

e) Find $P[X \le 5]$.

$$P[X \le 5] = p_X(1) + p_X(5) = \frac{1}{4} + \frac{1}{2} = \frac{3}{4}.$$

f) Find $P[X \le 4.99]$.

$$P[X \le 4.99] = p_X(1) = \frac{1}{4}.$$

g) Find $P[X \le 5.01]$.

$$P[X \le 5.01] = p_X(1) + p_X(5) = \frac{1}{4} + \frac{1}{2} = \frac{3}{4}.$$