

ECS 315: In-Class Exercise # 8 Solution

Instructions

1. Separate into groups of no more than three persons. Only one submission is needed for each group. The group cannot be the same as any of your former groups.
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.**

Date: 19/10/2017

Name	ID <small>(last 3 digits)</small>		
Prapun	5	5	5

Consider a random variable whose pmf is given by $p_X(x) = \begin{cases} \frac{1}{4}, & x = 1, 9, \\ c, & x = 4, \\ 0, & \text{otherwise.} \end{cases}$

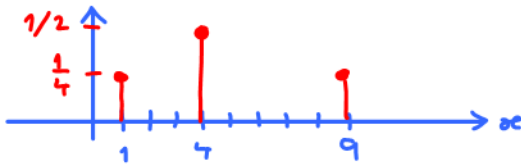
x	$p_X(x)$
1	1/4
4	c
9	1/4

a) Find the constant c.

$$\sum_x p_X(x) = 1 \Rightarrow p_X(1) + p_X(4) + p_X(9) = 1$$

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

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



c) Find $P[X \leq 5]$.

$$P[X \leq 5] = P[X=4] + P[X=1] = \frac{1}{2} + \frac{1}{4} = \frac{3}{4}$$

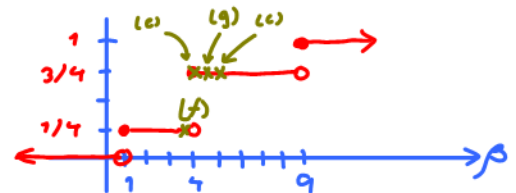
d) Find $P[X > 4] = P[X=9] = \frac{1}{4}$

e) Find $P[X \leq 4] = P[X=1] + P[X=4] = \frac{1}{4} + \frac{1}{2} = \frac{3}{4}$

f) Find $P[X \leq 3.99] = P[X=1] = \frac{1}{4}$

g) Find $P[X \leq 4.01] = P[X=1] + P[X=4] = \frac{1}{4} + \frac{1}{2} = \frac{3}{4}$

(h) (Optional) Plot $P[X \leq \beta]$



In section 8.2, this function of β is called the cumulative distribution function (cdf) of the RV X . There, we replace β by a lower-case x .