Assignment 6 (NCERT Class 10 Probability)

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***Abstract*—This document contains the solution to Example 3 of Chapter 15 (Probability) in the NCERT Class 10 Textbook.**

Example 3. Suppose we throw a die once.

(i) What is the probability of getting a number greater than 4?

(ii) What is the probability of getting a number less than or equal to 4?

Solution: Let the random variable X denote the number that appears on rolling the die. Then, we see that the sample space is $S = \{1, 2, 3, 4, 5, 6\}$. The PMF is given by

$$\Pr(X = k) = \begin{cases} \frac{1}{6}, & 1 \geq k \geq 6 \\ 0, & \text{otherwise} \end{cases} \tag{1}$$

The CDF can be derived from the PMF as follows:

$$F_X(k) = \Pr(X \leq k) = \sum_{i=1}^{i=k} \Pr(X = i) = \frac{k}{6} \tag{2}$$

Therefore, the CDF is explicitly given by

$$F_X(k) = \begin{cases} 0, & k < 1 \\ \frac{k}{6}, & 1 \leq k \leq 6 \\ 1, & k > 6 \end{cases} \tag{3}$$

Hence, using Figure 1,

$$\Pr(X \leq 4) = F_X(4) = \frac{4}{6} = \frac{2}{3} \tag{4}$$

$$\implies \Pr(X > 4) = 1 - F_X(4) \tag{5}$$

$$= 1 - \frac{2}{3} = \frac{1}{3} \tag{6}$$

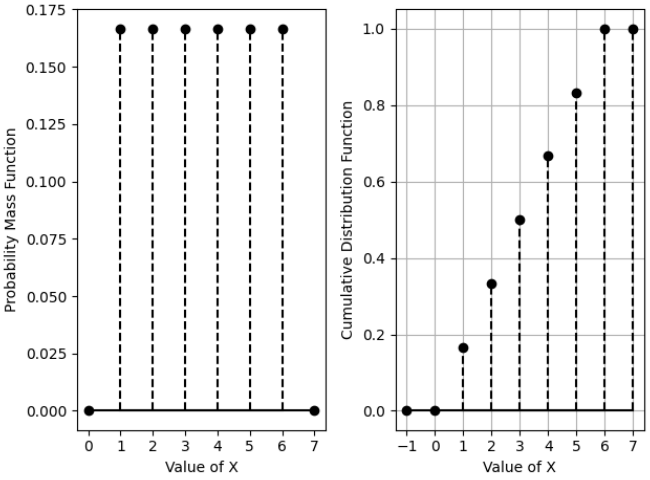

Fig. 1: Plot of the PMF (left) and CDF (right) of an unbiased die. Code: `codes/6_1.py`