Question 10.13.2.6
Probability and Random Processes

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Question 10.13.2.6:
A game consists of spinning an arrow which comes to rest pointing at one of the regions (1, 2 or 3) (Fig. 13.1). Are the outcomes 1, 2 and 3 equally likely to occur? Give reasons.

$$\therefore P_X(k) = \begin{cases} 0.25 & \text{, for k=1} \\ 0.25 & \text{, for k=2} \\ 0.5 & \text{, for k=3} \end{cases}$$

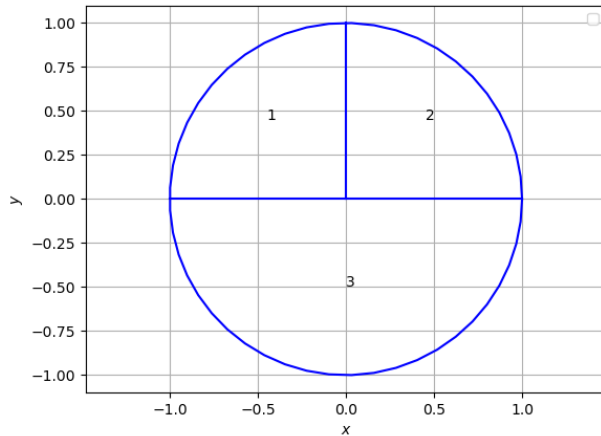$P_X(k)$ are not equal for all k. Therefore, the events are not equally likely.

Fig. 0. Fig:13.1

Solution:
Let, the probality mass function

$P_X(k)$ = Probability of the arrow to rest in region k

$$P_X(k) = \frac{\text{Angle covered by region k}}{\text{Total angle}} \quad (1)$$

$$\therefore P_X(1) = \frac{90°}{360°} = \frac{1}{4} \quad (2)$$

$$= 0.25 \quad (3)$$

$$P_X(2) = \frac{90°}{360°} = \frac{1}{4} \quad (4)$$

$$= 0.25 \quad (5)$$

$$P_X(3) = \frac{180°}{360°} = \frac{1}{2} \quad (6)$$

$$= 0.5 \quad (7)$$