

# AI1103-Assignment 1

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Download all python codes from

<https://github.com/Anirudh-Srinivasan-CS20/AI1103/tree/main/Assignment-1/Codes>

and latex-tikz codes from

<https://github.com/Anirudh-Srinivasan-CS20/AI1103/blob/main/Assignment-1/Assignment-1.tex>

## QUESTION

The mean of the numbers obtained on throwing a die having written 1 on three faces, 2 on two faces and 5 on one face is

- A) 1
- B) 2
- C) 5
- D)  $\frac{8}{3}$

## SOLUTION

Total number of faces in a die = 6

Let  $X \in \{0, 1, 2\}$  represent the random variable, where  $X$  being 0 represents faces of die in which 1 is written, 1 represents faces of die in which 2 is written, and 2 represents face of die in which 5 is written.

From the given information,

- 1) Probability that faces of die in which 1 is written is obtained =  $\Pr(X=0)$

$$\Pr(X = 0) = \frac{\text{Number of faces with 1}}{\text{Total number of faces}} \quad (0.0.1)$$

$$\Pr(X = 0) = \frac{3}{6} = \frac{1}{2} = 0.5 \quad (0.0.2)$$

- 2) Probability that faces of die in which 2 is written is obtained =  $\Pr(X=1)$

$$\Pr(X = 1) = \frac{\text{Number of faces with 2}}{\text{Total number of faces}} \quad (0.0.3)$$

$$\Pr(X = 1) = \frac{2}{6} = \frac{1}{3} = 0.\bar{3} \quad (0.0.4)$$

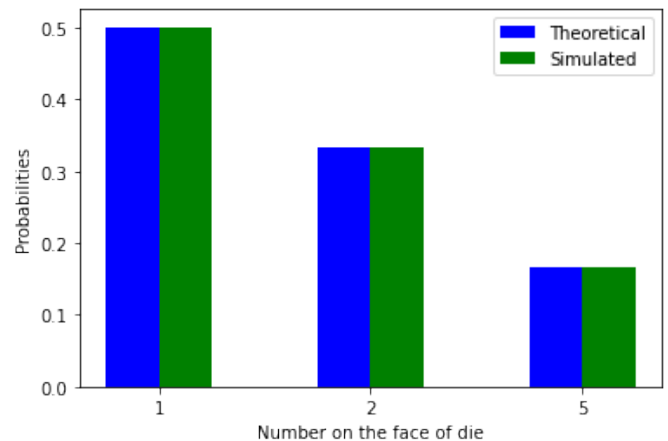
- 3) Probability that faces of die in which 5 is written is obtained =  $\Pr(X=2)$

$$\Pr(X = 2) = \frac{\text{Number of faces with 5}}{\text{Total number of faces}} \quad (0.0.5)$$

$$\Pr(X = 2) = \frac{1}{6} = 0.1\bar{6} \quad (0.0.6)$$

Random Variable [X]	Probability [ $\Pr(X)$ ]
0	$\frac{1}{2}$
1	$\frac{1}{3}$
2	$\frac{1}{6}$

TABLE 3: This table shows probability associated with each value that the random variable  $X$  can take.



The mean of the numbers obtained on throwing a die = Expected value on face of die

$$E(X) = \sum_{i=0}^2 \Pr(X = i) \times x_i \quad (0.0.7)$$

where:  $\Pr(X = i)$  represents the probability that  $X=i$  and  $x_i$  represents value obtained in face of the die when  $X=i$

$$= \frac{1}{2} \times 1 + \frac{1}{3} \times 2 + \frac{1}{6} \times 5 = 2 \quad (0.0.8)$$

Answer: Option B