

# Assignment 4

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Download all python codes from

<https://github.com/ayush-2321/AI1103/tree/main/assignment%203>

and latex-tikz codes from

<https://github.com/ayush-2321/AI1103/tree/main/assignment%203>

## PROBLEM 1.1 (GATE ME 2002)

Two die are thrown. What is the probability that sum of numbers on the two dice is eight

- (a)  $\frac{5}{36}$
- (b)  $\frac{5}{18}$
- (c)  $\frac{1}{4}$
- (d)  $\frac{1}{3}$

## 1 SOLUTION

Let  $X$  be a discrete random variable which denotes the sum obtained on two dice and  $X_1 \in \{1, 6\}$  be a discrete random variable denoting the outcome on a single die.

$$\Pr(X = n) = \begin{cases} 0, & \text{if } n < 1 \\ \frac{1}{6} \sum_{k=1}^{n-1} \Pr(X_1 = k), & \text{if } 1 \leq n-1 \leq 6 \\ \sum_{k=n-6}^6 \Pr(X_1 = k), & \text{if } 1 < n-6 \leq 6 \\ 0, & \text{if } n > 12 \end{cases} \quad (1.0.1)$$

Required probability =  $\Pr(X = 8)$

So, from (1.0.1),  $\Pr(X = 8) = \frac{5}{36}$