

# Assignment 2

Digjoy Nandi - AI20BTECH11007

Download all python codes from

<https://github.com/Digjoy12/probability/blob/main/Assignment%202/main.py>

and latex codes from

<https://github.com/Digjoy12/probability/blob/main/Assignment%202/main.tex>

## GATE PROBLEM-7

Given set  $A = [2, 3, 4, 5]$  and set  $B = [11, 12, 13, 14, 15]$ , two numbers are randomly selected, one from each set. What is the probability that the sum of the two numbers equals 16?

(a) 0.20 (b) 0.25 (c) 0.30 (d) 0.33

## SOLUTION

Given,

Set  $A = [2, 3, 4, 5]$

Set  $B = [11, 12, 13, 14, 15]$

From the above matrix, total number of element in the sample space is 20.

Let us define a random variable  $X \in \{0, 1\}$  where,

$X=0$  refers to the event when  $A+B=16$

$X=1$  refers to the event when  $A+B \neq 16$

Now, probability of selecting an element from set A such that  $\Pr(X = 0)$  is

$$\Pr(X = 0) = \Pr(A + B = 16) = 1 \quad (7.1)$$

So, the probability of selecting an element from set B after selecting an element from set A such that  $\Pr(X = 0)$  is

$$\Pr(X = 0) = \Pr(A + B = 16) = \frac{1}{5} \quad (7.2)$$

Therefore,

Overall probability of randomly choosing elements from set A and set B such that  $\Pr(X = 0)$  is

$$\Pr(X = 0) = \Pr(A + B = 16) \quad (7.3)$$

$$\Pr(X = 0) = 1 \times \frac{1}{5} \quad (7.4)$$

$$\Pr(X = 0) = \frac{1}{5} = 0.2 \quad (7.5)$$

X	0	1
Pr(X)	$\frac{1}{5}$	$\frac{4}{5}$

TABLE 0: Probability distribution table

Therefore, the correct option is (a).