Assignment

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AI21MTECH02003

Download the source code and LaTex file from :

Code source: https://github.com/harshal9876/AI5002/blob/main/Assignment_8/Codes/Assignemnt_8.py
LaTex code : https://github.com/harshal9876/AI5002/blob/main/Assignment_8/Assignment_8.tex

1 GATE 7

Problem: 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 probability that the sum of the two numbers equals 16?
(a) 0.20
(b) 0.25
(c) 0.30
(d) 0.33

2 Solution

Given A = { 2,3,4,5 } and Set B = { 11,12,13,14,15 } . the possible combinations of selecting one number from each set is :

{ (2,11),(2,12),(2,13),(2,14),(2,15),(3,11),(3,12),(3,13),(3,14),(3,15),(4,11),(,4,12),(4,13),(4,14),(4,15),(5,11),(5,12),(5,13),(5,14),(5,15) }

Let X and Y be the random variable from each set A and B respectively, represented by .

$$X = \begin{cases} 1, & \text{if X is a number in set A} \\ 0, & \text{otherwise} \end{cases}$$

similarly ,

$$Y = \begin{cases} 1, & \text{if Y is a number in set B} \\ 0, & \text{otherwise} \end{cases}$$

Given a number is chosen from set A and set B respectively , X =1 and Y =1 . Let :

$$K = Y + X \tag{2.0.1}$$

$$K = \begin{cases} 1, & \text{if X + Y = 16} \\ 0, & \text{otherwise} \end{cases} \tag{2.0.2}$$

The samples that sums up to 16 are
= { (2,14),(3,13),(4,12),(5,11) }
Cardinality of the favourable events is : 4
Cardinality of the sample space is : 20

$$\text{probability} = \frac{\text{Favourable sample space}}{\text{Total number of outcomes}} \tag{2.0.3}$$

$$\text{probability} = \frac{4}{20} \tag{2.0.4}$$

$$\text{probability} = 0.2 \tag{2.0.5}$$

The required probability of getting a sum of 16 when choosing two numbers in random is 0.2

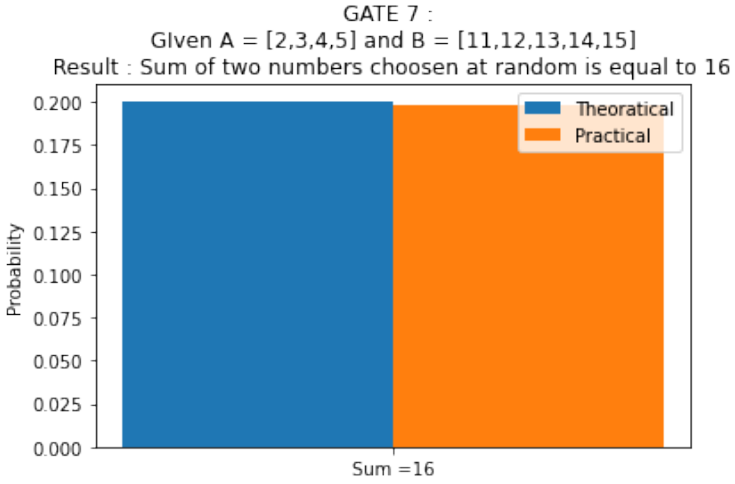

Fig. 1: Calculated versus theoretical probability