

AI1110 Assignment 1

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EE22BTECH11204

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Question: 12.13.1.14 Given that the two numbers appearing on throwing two dice are different. Find the probability of the event the sum of numbers in the dice is 4

Solution:

Consider two random variables X and Y:

X = The number on the 1st dice ;

$$X \in [1, 6]$$

Y = The number on the 2nd dice ;

$$Y \in [1, 6]$$

let A denote the event: The sum of the numbers on both the dies equal to 4.

To find,

$$Pr(A|X \neq Y)$$

$$Pr(A|X \neq Y) = \frac{1}{15}$$

\therefore The probability of the event the sum of the dices is 4 given that the two dices show different number is $\frac{1}{15}$.

Sample Space(S):

Since X and Y are different, there are 30 possible outcomes:

(1,2), (1,3), (1,4), (1,5), (1,6), (2,1), (2,3), (2,4), (2,5), (2,6), (3,1), (3,2), (3,4), (3,5), (3,6), (4,1), (4,2), (4,3), (4,5), (4,6), (5,1), (5,2), (5,3), (5,4), (5,6), (6,1), (6,2), (6,3), (6,4), (6,5)

Favorable Outcomes(F):

Out of these 30 outcomes, there are 2 outcomes where the sum of X and Y is 4: (1,3) and (3,1).

The probability of event is:

$$Pr(A|X \neq Y) = \frac{F}{S}$$

$$Pr(A|X \neq Y) = \frac{2}{30}$$