

ASSIGNMENT-1

AI1110:Probability and random variables

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

ANSWER: $\frac{1}{15}$

SOLUTION: Let S be the sample space of the event.

Hence required probability is,

$$\Pr(A/B) = \frac{\Pr(A \cap B)}{\Pr(B)}$$

$$\Pr(A/B) = \frac{\frac{2}{36}}{\frac{30}{36}} = \frac{2}{30} = \frac{1}{15}$$

$$S = \begin{bmatrix} 11 & 21 & 31 & 41 & 51 & 61 \\ 21 & 22 & 32 & 42 & 52 & 62 \\ 31 & 23 & 33 & 43 & 53 & 63 \\ 41 & 24 & 34 & 44 & 54 & 64 \\ 51 & 25 & 35 & 45 & 55 & 65 \\ 61 & 26 & 36 & 46 & 56 & 66 \end{bmatrix}$$

$$n(S)=36$$

Let A represents the event "the sum of numbers on the dice is 4".

Let B represents the event "the two numbers appearing on throwing two dice are different".

$$A = \{13, 22, 31\}, n(A)=3$$

$$\Pr(A) = \frac{n(A)}{n(S)} = \frac{3}{36}$$

$$B = \begin{bmatrix} 12 & 21 & 32 & 41 & 51 & 61 \\ 13 & 23 & 33 & 43 & 53 & 63 \\ 14 & 24 & 34 & 44 & 54 & 64 \\ 15 & 25 & 35 & 45 & 55 & 65 \\ 16 & 26 & 36 & 46 & 56 & 66 \end{bmatrix}$$

$$n(B) = 30 \implies \Pr(B) = \frac{30}{36}$$

$$A \cap B = \{13, 31\} \implies n(A \cap B) = 2$$

$$\Pr(A \cap B) = \frac{2}{36}$$