Probability Assignment -I

Gujjula Samarasimha Reddy(AI23MTECH02001)

Question:
Two dice are thrown at the same time. Find the probability of getting

1) same number on both dice.
2) different numbers on both dice.

Solution:

(1)

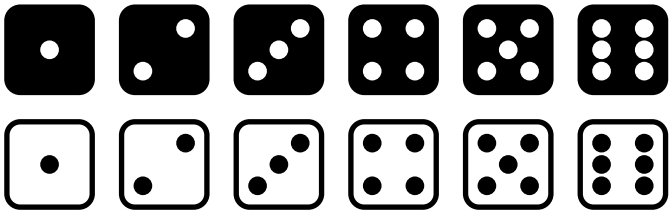
Let S represents the total sample space when two dice are rolled
Then

$$S \in \begin{Bmatrix} (1,1) & (1,2) & (1,3) & (1,4) & (1,5) & (1,6) \\ (2,1) & (2,2) & (2,3) & (2,4) & (2,5) & (2,6) \\ (3,1) & (3,2) & (3,3) & (3,4) & (3,5) & (3,6) \\ (4,1) & (4,2) & (4,3) & (4,4) & (4,5) & (4,6) \\ (5,1) & (5,2) & (5,3) & (5,4) & (5,5) & (5,6) \\ (6,1) & (6,2) & (6,3) & (6,4) & (6,5) & (6,6) \end{Bmatrix}$$

There are total 36 possible outcomes when two dice are rolled and altogether represents the samplespace mages

Let A be the event that represents getting same number on the both the dice
$A \in \{(1,1),(2,2),(3,3),(4,4),(5,5),(6,6)\}$

There are total 6 possible outcomes that all together represents the event A



$$\Pr(A) = \frac{6}{36}$$
$$\Pr(A) = \frac{1}{6}$$

(2)

From the above analysis we got to know that the propbability of getting same number as

$$\Pr(A) = \frac{1}{6}$$

Let define B is an event of getting different number on both the dice when they are rolled
Events A and B are mutually exclusive
As we defined only two events on whole sample space and they are mutually exclusive :

$$A \cap B = \emptyset$$
$$\Pr(A \cap B) = 0$$
$$\therefore \Pr(A \cup B) = \Pr(A) + \Pr(B)$$
$$\Pr(A) + \Pr(B) = 1$$
$$\Pr(B) = 1 - \Pr(A)$$
$$\Pr(B) = 1 - \frac{1}{6}$$
$$\Pr(B) = \frac{5}{6}$$

Probability of Dice Outcomes

Parameter	Value	Description
Same number on both dice	$\frac{1}{6}$	The probability of getting the same number on both dice.
Different numbers on both dice	$\frac{5}{12}$	The probability of getting different numbers on both dice.