

PROBABILITY

Elementary event (E) :

Only one outcome
sum of the probabilities of all elementary events is 1.

$$0 \leq P(E) \leq 1$$

$$P(E) = \frac{\text{No. of outcomes favourable to E}}{\text{No. of all possible outcomes}}$$

EVENT(E)

		36 possibilities in throwing two dices simultaneously					
2 nd dice	1 st dice	1	2	3	4	5	6
		(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
2		(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
3		(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
4		(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
5		(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
6		(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

Examples

Case -1) One dice is rolled:

P(1) = Probability of getting 1.

$$P(1) = \frac{1}{6}$$

Similarly P(2), P(3), P(4), P(5) & P(6)

$$= \frac{1}{6}$$

P(E > 4) → Probability of getting 5 & 6.

$$P(E > 4) = P(5) + P(6)$$

$$= \frac{2}{6} = \frac{1}{3}$$

$$P(E \leq 4) = P(1) + P(2) + P(3) + P(4)$$

$$= \frac{4}{6} = \frac{2}{3}$$

Applications

Gambling, insurance & statistics control theory.

Complimentary Events(E)

Not E = $\bar{E}$, $P(\bar{E}) = 1 - P(E)$

In case 1 :

$$P(1) = \frac{1}{6}; P(\bar{1}) = 1 - \frac{1}{6} = \frac{5}{6}$$

$$P(\bar{1}) = \text{not getting 1;}$$

$$= \text{getting 2, 3, 4, 5 and 6}$$

Certain event $P(E) = 1$

Impossible event $P(E) = 0$

In case 2 :

P(sum 13) is impossible.

hence, $P(\text{sum } 13) = 0$

Case -2) Two dice are rolled:

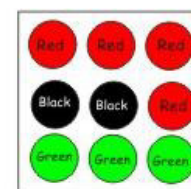
P(sum = 8) = Probability of getting two numbers whose sum is 8.

Sum = 8 for
(2,6) (3,5) (4,4) (5,3) (6,2)

$$P(\text{sum } 8) = \frac{5}{36}$$

Case -3) Box with balls :

A box contains 2 black, 3 green and 4 red balls.



Probability of picking up black
 $P(B) = \frac{2}{9}$

NCERT / X / Probability