

NCERT Class 11 Mathematics Solutions: Chapter 16 – Probability Miscellaneous Exercise Part 1

$$\text{Theoretical Probability} = \frac{\text{Number of favorable (desired) outcomes}}{\text{Total number of possible outcomes}}$$

Theoretical Probability

1. A box contains 10 red marbles, 20 blue marbles and 30 green marbles. 5 Marbles are drawn from the box, what is the probability that

(i) all will be blue?

(ii) at least one will be green?

Answer:

$$\text{Total number of marbles} = 10 + 20 + 30 = 60$$

$$\text{Number of ways of drawing 5 marbles from 60 marbles} = {}^{60}C_5$$

Answer: (i)

All the drawn marbles will be blue if we draw 5 marbles out of 20 blue marbles.

5 blue marbles can be drawn from 20 blue marbles in ${}^{20}C_5$ ways.

$$\text{Probability that all marbles will be blue} = \frac{{}^{20}C_5}{{}^{60}C_5}$$

Answer: (ii)

$$\text{Number of ways in which the drawn marble is not green} = {}^{(20+10)}C_5 = {}^{30}C_5$$

$$\text{Probability that no marble is green} = \frac{{}^{30}C_5}{{}^{60}C_5}$$

$$\text{Probability that at least one marble is green} = 1 - \frac{{}^{30}C_5}{{}^{60}C_5}$$

2. 4 cards are drawn from a well-shuffled deck of 52 cards. What is the probability of obtaining 3 diamonds and one spade?

Answer:

Number of ways of drawing 4 cards from 52 cards = ${}^{52}C_4$

In a deck of 52 cards, there are 13 diamonds and 13 spades.

Number of ways of drawing 3 diamonds and one spade = ${}^{13}C_3 \times {}^{13}C_1$

The probability of obtaining 3 diamonds and one spade = $\frac{{}^{13}C_3 \times {}^{13}C_1}{{}^{52}C_4}$

3. A die has two faces each with number '1', three faces each with number '2' and one face with number '3'. If die is rolled once, determine

(i) $P(2)$

(ii) $P(1 \text{ or } 3)$

(iii) $P(\text{not } 3)$

Answer:

Total number of faces = 6

Answer: (i)

Number faces with number '2' = 3

$$\therefore P(2) = \frac{3}{6} = \frac{1}{2}$$

Answer: (ii)

$$\begin{aligned} P(1 \text{ or } 3) &= P(\text{not } 2) = 1 - P(2) \\ &= 1 - \frac{1}{2} = \frac{1}{2} \end{aligned}$$

Answer: (iii)

Number of faces with number '3' = 1

$$\therefore P(3) = \frac{1}{6}$$

So, $P(\text{not } 3) = 1 - P$

$$= 1 - \frac{1}{6} = \frac{5}{6}$$