A bag contains 5 white balls, 6 red balls and 9 green balls. A ball is drawn at random from the bag. Find the probability that the ball drawn is:

(i) a green ball

(ii) a white or a red ball.

(iii) Neither a green ball nor a white ball

Solution:

Number of white balls = 5

Number of red balls = 6

Number of green balls = 9

$\therefore$ Total number of balls = 5 + 6 + 9 = 20

(i) $P(\text{Green ball}) = \dfrac{\text{Number of Green balls}}{\text{Total number of balls}} = \dfrac{9}{20}$

(ii) $P(\text{White ball or Red ball}) = P(\text{White ball}) + P(\text{Red ball})$

$$= \frac{\text{Number of White balls}}{\text{Total number of balls}} + \frac{\text{Number of Red balls}}{\text{Total number of balls}}$$

$$= \frac{5}{20} + \frac{6}{20}$$

$$= \frac{11}{20}$$

(iii) $P(\text{Neither Green ball nor White ball}) = P(\text{Red ball})$

$$= \frac{\text{Number of Red balls}}{\text{Total number of balls}}$$

$$= \frac{6}{20}$$

$$= \frac{3}{10}$$

A game of numbers has cards marked with 11, 12, 13, ..., 40. A card is drawn at random. Find the probability that the number on the card drawn is:

(i) A perfect square

(ii) Divisible by 7.

Solution:

Total number of outcomes = 30

(i) The perfect squares from 11 to 40 are 16, 25 and 36. So, the number of possible outcomes = 3

Hence, the probability that the number on the card drawn is a perfect square

=

$$= \frac{Number \quad of \quad possible \quad outcomes}{Total \quad number \quad of \quad outcomes} = \frac{3}{30} =$$

(ii) Among the given numbers, 14, 21, 28 and 35 are divisible by 7. So, the number of possible outcomes = 4 Hence, the probability that the number on the card drawn is divisible by 7

$$= \frac{\text{Number of possible autoomes}}{\text{Total number of outoomes}} = \frac{4}{30} = \frac{2}{15}$$

aw a card from the box. What is the probability that the card drawn is:

i. a vowel

ii. a consonant

iii. none of the letters of the word median?

Solution:

Here, Total number of all possible outcomes = 16

i. a, e, i and o are the vowels.

Number of favourable outcomes = 4

∴ Required Probability =

$$\frac{\text{Number of favourable outcomes}}{\text{Total number of all possible outcomes}} = \frac{4}{16} = \frac{1}{4}$$

ii. Number of consonants = 16 − 4 (vowels) = 12

∴ Number of favourable outcomes = 12

∴ Required Probability =

$$\frac{\text{Number of favourable outcomes}}{\text{Total number of all possible outcomes}} = \frac{12}{16} = \frac{3}{4}$$

iii. Median contains 6 letters.

∴ Number of favourable outcomes = 16 − 6 = 10

∴ Required Probability =

Number of favourable outcomes

A box contains a certain number of balls. On each of 60% balls, letter A is marked. On each of 30% balls, letter B is marked and on each of remaining balls, letter C is marked. A ball is drawn from the box at random. Find the probability that the ball drawn is:

i. marked C

ii. A or B

iii. neither B nor C

Solution:

A box contains,

60% balls, letter A is marked.

30% balls, letter B is marked.

10% balls, letter C is marked.

i. Total number of all possible outcomes = 100

Number of favourable outcomes = 10

∴ Required Probability =

$$\frac{\text{Number of favou rable outcomes}}{\text{Total number of all possible outcomes}} = \frac{10}{100} = \frac{1}{10}$$

ii. The probability that the ball drawn is marked A =

$$\frac{\text{Number of favourable outcomes}}{\text{Total number of all possible outcomes}} = \frac{60}{100} = \frac{6}{10}$$

... (1)

... (2)

$\therefore$ Required Probability = $\frac{6}{10} + \frac{3}{10} = \frac{9}{10}$

iii. The probability that the ball drawn is neither B nor C

$= 1 - [P(B) + P(C)]$

$= 1 - \left[\frac{3}{10} + \frac{1}{10}\right]$

$= 1 - \frac{4}{10}$

$= \frac{6}{10}$

$= \frac{3}{5}$

Question 38.

A box contains a certain number of balls. Some of these balls are marked A, some are marked B and the remaining are marked C. When a ball is drawn at random from the box P(A) = $\frac{1}{3}$ and P(B) = $\frac{1}{4}$. If there are 40 balls in the box which are marked C, find the number of balls in the box.

Solution:

P(C) = 1 − [P(A) + P(B)] =

$$1-\left[\frac{1}{3}+\frac{1}{4}\right]=1-\frac{7}{12}=\frac{5}{12}$$

Probability = $\frac{\text{Number of favourable outcomes}}{\text{Total number of all possible outcomes}}$

Given that 40 balls in the box are marked C.

$$\Rightarrow \frac{5}{12}=\frac{40}{\text{Total number of all possible outcomes}}$$

⇒ Total number of all possible outcomes =

$$\frac{40\times12}{5}=96$$

∴ the number of balls in the box is 96.