Probability

EXERCISE - 24.1

Q1. A bag contains a red ball, a blue ball and yellow ball, all the balls being of same size Anjali takes out a ball from a bag without looking into it. what is the probability that she takesout
(i) Yellow ball ?
(ii) red ball ?
(iii) blue ball ?

Sol. Red ball = 1, Blue ball = 1, Yellow ball = 1

Total balls = 3

(i) probability of taking yellow ball = $\frac{\text{favourable}}{\text{Total}} = \frac{1}{3}$

(ii) probability of taking red ball = $\frac{\text{favourable}}{\text{total}} = \frac{1}{3}$

(iii) probability of taking blue ball = $\frac{\text{favourable}}{\text{total}} = \frac{1}{3}$

Q2. A box contains 600 screws, one-tenth are rusted. one screw is takenout at random from this box. find the probability that it is a good screw.

Sol. Total Screws = 600

Rusted = $\frac{1}{10} \times 600 = 60$

Good Screws = $600 - 60 = 540$

probability of taking good screws = $\frac{\text{favourable}}{\text{Total}}$

$= \frac{540}{600}$

$= \frac{9}{10}$

Q3 In a lottery, there are 5 prized tickets and 995 blank tickets. A person buys a lottery ticket find the probability of his winning a prize.

Sol. prized tickets = 5

Black tickets = 995

Total tickets = 1000

probability of winning a prize = $\frac{\text{favourable}}{\text{total}}$

$= \frac{5}{1000}$

$= \frac{1}{200}$

Q4 12 defective pens are accidentally mixed with 132 good ones. It is not possible to just look at a pen and tell whether or not is defective. one pen is taken out at random from this lot. Determine the probability that then pen taken out is a good one.

Sol. Defective pen = 12

Good ones = 132

Total pens = 144

probability of taken a good pen = $\frac{\text{favourable}}{\text{total}}$

$= \frac{132}{144}$

$= \frac{11}{12}$

Q5 If the probability of winning a game is $\frac{5}{11}$, what is the probability of losing?

Sol. probability of winning a game = $\frac{5}{11}$

Total probability = 1

probability of losing = 1 - probability of winning = $1 - \frac{5}{11} = \frac{6}{11}$.

Q6. Two players, Sania and Sonali play a tennis match. It is known that the probability of Sania winning the match is 0.69. what is the probability of Sonali winning?

Sol. probability of Sania winning the match = 0.69

probability of Sania losing the match = 1 − probability of winning

$= 1 - 0.69 = 0.31$.

∴ probability of Sonali winning = 0.31

Q7. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. what is the probability that the ball is (i) red (ii) not red?

Sol. Red balls = 3, Black balls = 5

total balls = 3 + 5 = 8

(i) probability of drawing red ball $= \frac{\text{favourable}}{\text{total}} = \frac{3}{8}$

(ii) probability of drawing not red ball $= \frac{\text{favourable}}{\text{total}} = \frac{5}{8}$

Q8. There are 40 students in class X of a school of which 25 are a girls and the others are boys. The class teacher has to select one student as a class representative. She writes the name of each student on a separate card. the cards being identical. Then she puts cards in a bag and stirs them thoroughly. She then draws one card from the bag. what is the probability that the name written on the card is the name of (i) a girl (ii) a boy?

Sol. Total students = 40

No. of girls = 25

No. of boys = 15

(i) probability (a girl name) $= \frac{\text{No. of girls}}{\text{Total students}} = \frac{25}{40} = \frac{5}{8}$

(ii) probability (a boy name) $= \frac{\text{No. of boys}}{\text{Total students}} = \frac{15}{40} = \frac{3}{8}$

Q9. A letter is chosen from the word 'TRIANGLE'. what is the probability that it is a vowel?

Sol. Total number of letters in the word TRIANGLE = 8

Vowels are A, E, I

probability of chosing a vowel $= \frac{\text{No. of vowels}}{\text{Total}} = \frac{3}{8}$

Q10. A box contains 5 red marbles, 8 white marbles and 4 green marbles. one marble is taken out of the box at random. what is the probability that the marble taken out will be (i) red? (ii) white (iii) not green?

Sol. Red marbles = 5, white marbles = 8, green marbles = 4

total marbles = 5 + 8 + 4 = 17

(i) probability of taking a red marbles $= \frac{\text{No. of red marbles}}{\text{Total marbles}}$

$= \frac{5}{17}$

(ii) probability of taking a white marbles

$= \frac{\text{No. of white marbles}}{\text{total marbles}} = \frac{8}{17}$

(iii) probability of taking not green

$$= \frac{\text{No. of red + No. of white}}{\text{total marbles}} = \frac{13}{17}$$

Q11. A bag contains 5 black, 7 red and 3 white balls. a ball is drawn from the bag at random. find the probability that the ball drawn is
(i) red (ii) black or white (iii) not black.

Sol. No. of black balls = 5

No. of red balls = 7

No. of white balls = 3

Total no. of balls = 3 + 7 + 5 = 15

(i) probability of drawing a red ball $= \frac{\text{No. of red balls}}{\text{total balls}} = \frac{7}{15}$

(ii) probability of drawing a black or white $= \frac{5+3}{15} = \frac{8}{15}$

(iii) probability of drawing not a black ball $= \frac{7+3}{15} = \frac{10}{15} = \frac{2}{3}$

Q12. A bag contains 5 red, 6 black and 4 white balls. A ball is drawn at random from the bag. find the probability that the ball drawn is (i) white (ii) not black (iii) red or black (iv) neither red nor black.

Sol. No. of red balls = 5

No. of black balls = 6.

No. of white balls = 4

Total no. of balls = 15

(i) probability of drawing a white ball

$$= \frac{\text{No. of white balls}}{\text{Total no. of balls}} = \frac{4}{15}$$

(ii) probability of drawing not a black ball

$$= \frac{\text{No. of red + No. of white ball}}{\text{Total no. of balls}} = \frac{5+4}{15} = \frac{9}{15} = \frac{3}{5}$$

(iii) probability of drawing red or black $= \frac{\text{favourable}}{\text{total}} = \frac{5+6}{15} = \frac{11}{15}$

(iv) probability of drawing neither red nor black

$$= \frac{\text{No. of white balls}}{\text{Total no. of balls}} = \frac{4}{15}$$

Q13. If 65% of the population have black eyes, 25% have brown eyes and remaining have blue eyes, what is the probability that a person selected at random has (i) blue eyes (ii) brown or black eyes (iii) blue or black eyes (iv) neither blue nor brown eyes ?

Sol. population having black eyes = 65%.

population having brown eyes = 25%.

Total population = 100%.

So population having blue eyes $= [100 - (65+25)] = 10\%$.

(i) probability that person has blue eyes

$$= \frac{\text{population having blue eyes}}{\text{Total population}} = \frac{10}{100} = \frac{1}{10}$$

(ii) probability that person has brown or blue eyes

$$= \frac{\text{population having brown + black eyes}}{\text{Total population}} = \frac{65+25}{100} = \frac{90}{100} = \frac{9}{10}$$

(iii) probability that person has blue or black eyes

$$= \frac{\text{population having blue + black eyes}}{\text{Total population}} = \frac{10+65}{100} = \frac{75}{100} = \frac{3}{4}.$$

(iv) probability that person has neither blue nor black eyes

$$= \frac{\text{population having black eyes}}{\text{Total population}} = \frac{65}{100} = \frac{13}{20}$$

Q14. A bag contains 6 red balls, 8 white balls, 5 green balls and 3 black balls. one ball is drawn at random from the bag. find the probability that the balls is: (i) white (ii) red or black (iii) not green (iv) neither white nor black.

Sol. No. of red balls = 6

No. of white balls = 8

No. of green balls = 5

No. of black balls = 3

Total no. of balls = 22

(i) probability of drawing a white ball $= \frac{\text{No. of white balls}}{\text{Total no. of balls}}$

$$= \frac{8}{22} = \frac{4}{11}$$

(ii) probability of drawing red or black $= \frac{\text{No. of red + No. of black balls}}{\text{Total balls}}$

$$= \frac{6+3}{22} = \frac{9}{22}$$

(iii) probability of drawing not a green balls

$$= \frac{\text{No. of red + No. of white + No. of black}}{\text{Total balls}} = \frac{6+8+3}{22} = \frac{17}{22}$$

(iv) probability of drawing neither white nor black

$$= \frac{\text{No. of red + No. of green balls}}{\text{Total balls}} = \frac{6+5}{22} = \frac{11}{22} = \frac{1}{2}$$

Q15 A Carton Consists of 100 shirts of which 88 are good, 8 have minor defects and 4 have major defects. peter, a trader, will only accept the shirts which are good, but Salim, another trader, will only reject the shirts which have major defects. one shirt is drawn at random from the Carton. what is the probability that
(i) It is acceptable to peter ?
(ii) It is acceptable to Salim ?

Sol. Total no. of shirts = 100
Shirts with minor defects = 88
Shirts with major defects = 4

(i) probability that shirt acceptable by peter

$$= \frac{\text{No. of good shirts}}{\text{Total shirts}} = \frac{88}{100} = \frac{22}{25}$$

(ii) probability that shirt acceptable by Salim

$$= \frac{\text{No. of good shirts + shirts with minor defects}}{\text{Total shirts}}$$

$$= \frac{88+8}{100} = \frac{96}{100} = \frac{24}{25}$$

Q16. In a Single throw of a die, find the probability of getting:
(i) an odd number (ii) A number lessthan 5
(iii) a number greaterthan 5 (iv) a prime number
(v) a number lessthan 8 (vi) a number divisible by 3
(vii) a number between 3 and 6
(viii) a number divisible 2 or 3.

Sol. Sample Space in a Single throw of a die $S = \{1, 2, 3, 4, 5, 6\}$

(i) Odd numbers are 1, 3 and 5

$\therefore$ probability $= \frac{\text{favourable}}{\text{total}} = \frac{3}{6} = \frac{1}{2}$.

(ii) Number lessthan 5 are 1, 2, 3 and 4

$\therefore$ probability $= \frac{\text{favourable}}{\text{total}} = \frac{4}{6} = \frac{2}{3}$.

(iii) Number greaterthan 5 is 6

$\therefore$ probability $= \frac{\text{favourable}}{\text{total}} = \frac{1}{6}$

(iv) prime numbers are 2, 3 and 5

$\therefore$ probability $= \frac{\text{favourable}}{\text{total}} = \frac{3}{6} = \frac{1}{2}$.

(v) number lessthan 8 are 1, 2, 3, 4, 5, 6

$\therefore$ probability $= \frac{\text{favourable}}{\text{total}} = \frac{6}{6} = 1$

(vi) numbers divisible by 3 are 3 and 6.

$\therefore$ probability $= \frac{\text{favourable}}{\text{total}} = \frac{2}{6} = \frac{1}{3}$.

(vii) Numbers between 3 and 6 are 4 and 5

$\therefore$ probability $= \frac{\text{favourable}}{\text{total}} = \frac{2}{6} = \frac{1}{3}$.

(viii) Numbers of divisible by 2 or 3 are 2, 3, 4, 6

$\therefore$ probability $= \frac{\text{favourable}}{\text{total}} = \frac{4}{6} = \frac{2}{3}$.

Q17. A child has a die whose six faces show the letters as given below:

A	B	C	D	E	A

The die is thrown once. What is the probability of getting (i) A ? (ii) D ?

Sol. (i) probability of getting $A = \frac{2}{6} = \frac{1}{3}$

(ii) probability of getting $D = \frac{1}{6}$

Q18. A game of chance consist of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 (shown in the adjoining figure) and these are equally likely outcomes. What is the probability that it will point at (i) 8 ? (ii) an odd number (iii) a number greaterthan 2 ? (iv) a number lessthan 9 ?

Sol. (i) probability $= \frac{1}{8}$

(ii) odd numbers are 1, 3, 5, 7

$$p(\text{odd}) = \frac{4}{8} = \frac{1}{2}$$

(iii) numbers greaterthan 2 are 3, 4, 5, 6, 7, 8

$$p(\text{greaterthan } 2) = \frac{6}{8} = \frac{3}{4}$$

(iv) all numbers are lessthan 9

$$\therefore p(\text{lessthan } 9) = \frac{8}{8} = 1$$

Q19. Find the probability that the month of january may have 5 mondays in (i) a lead year (ii) a non-leap year?

Sol. (i) In a leap year there are 366 days. In january there are 31 days and 28 days make 4 weeks which means 4 mondays are there. now we have to find probability of having monday out of remaining 3 days. Now 3 days can be (Sunday, Monday, Tuesday, Wednesday, Thursday, friday, saturday).

let the event be having a monday

The no. of outcomes = 3

$\therefore$ probability (having 5 mondays) = $\frac{3}{7}$

(ii) In a non-leap year there are 365 days.

In january there are 31 days and 28 days make 4 weeks which means 4 mondays are there now we have to find proof of having monday out of remaining 3 days.

Now 3 days can be (Sunday, Monday, Tuesday, Wednesday, Thursday, friday, saturday)

let the event of "having a monday" the no. of favourable outcomes = 3

$\therefore$ probability (having 5 mondays) = $\frac{3}{7}$

Q20. Find the probability that the month of february may have 5 wednesdays in

(i) a leap year

(ii) a non-leap year.

Sol. (i) In a leap year there are 29 days in February 28 days make 4 weeks now we have to find probability of having wednesday out of remaining 1 day.

Now 1 day can be (Sunday, Monday, Tuesday, Wednesday, Thursday, friday, saturday)

let the event "having a wednesday"

the no. of outcomes = 1

∴ probability (having 5 wednesdays) = $\frac{1}{7}$

(ii) In non leap year there are 28 days in febrdary which makes only 4 weeks. therefore proof of having 5 wednesday is 0.

Q21. A box contains 25 cards numbered from 1 to 25. A card is drawn from the box at random. find the probability that the number on the card is: (i) even (ii) prime (iii) multiple of 6.

Sol. Cards numbered 1, 2, 3, ... 25

(i) even numbers are 2, 4, 6, 8, ... 24

$P(\text{even}) = \frac{12}{25}$

(ii) prime numbers are 2, 3, 5, 7, 11, 13, 17, 19 and 23.

$P(\text{prime}) = \frac{9}{25}$

(iii) multiple of 6 are 6, 12, 18 & 24

$P(\text{multiple of 6}) = \frac{4}{25}$

Q22. A box contains 15 cards numbered 1, 2, 3 ... 15 which are mixed thoroughly. a card is drawn from the box at random. find the probability that the number on the card is:
(i) odd (ii) prime (iii) divisible by 3 (iv) divisible by 3 and 2 both
(v) divisible by 3 or 2 (vi) a perfect square number.

Sol. Cards numbered 1, 2, 3, ... 15

(i) odd numbers 1, 3, 5, 7, 9, 11, 13, 15

$\therefore$ Probability $= \frac{\text{favourable}}{\text{total}} = \frac{8}{15}$

(ii) prime numbers are 2, 3, 5, 7, 11, 13

$P(\text{prime numbers}) = \frac{6}{15} = \frac{2}{5}$

(iii) Numbers divisible by 3 are 3, 6, 9, 12, 15

$P(\text{divisible by } 3) = \frac{5}{15} = \frac{1}{3}$

(iv) Numbers divisible by 3 and 2 both are 6 and 12

$P(\text{divisible by } 3 \& 2) = \frac{2}{15}$

(v) Numbers divisible by 3 or 2 are 2, 3, 4, 6, 8, 9, 10, 12, 14, 15

$P(\text{divisible by } 3 \text{ or } 2) = \frac{10}{15} = \frac{2}{3}$

(vi) Numbers which are perfect square are 1, 4 & 9

$P(\text{perfect square}) = \frac{3}{15} = \frac{1}{5}$

Q23. A box contains 19 balls bearing numbers 1, 2, 3, ... 19. A ball is drawn at random from the box. find the probability that the number on the ball is:
(i) A prime number. (ii) Divisible by 3 or 5
(iii) neither divisible by 5 or 10.
(iv) An even number.

Sol. Balls bearing numbers 1, 2, 3, ... 19

(i) prime numbers are 2, 3, 5, 7, 11, 13, 17 & 19

$$\text{probability} = \frac{\text{favourable}}{\text{total}} = \frac{8}{19}$$

(ii) numbers divisible by 3 or 5 are 3, 5, 6, 9, 10, 12, 15, 18

$$\text{probability} = \frac{8}{19}$$

(iii) Numbers divisible by 5 or 10 are 5, 10, 15

Numbers neither divisible by 5 or 10 $= 19 - 3 = 16$

$$\text{probability} = \frac{16}{19}$$

(iv) Even numbers are 2, 4, 6, 8, 10, 12, 14, 16, 18

$$\text{probability} = \frac{9}{19}$$

Q24 Tickets numbers 3, 5, 7, 9, ... 29 are placed in a box and mixed thoroughly. one ticket is drawn at random from the box. find the probability that the number on the ticket is (i) a prime number (ii) a number lessthan 16 (iii) a number divisible by 3.

Sol. Tickets numbered 3, 5, 7, 9, ... 29

(i) prime numbers are 3, 5, 7, 11, 13, 17, 19, 23 & 29

$$\text{probability} = \frac{\text{favourable}}{\text{total}} = \frac{9}{14}$$

(ii) Numbers lessthan 16 are 3, 5, 7, 9, 11, 13 & 15

$$\text{probability} = \frac{7}{14} = \frac{1}{2}$$

(iii) Numbers divisible by 3 are 3, 9, 15, 21 & 27

$$\text{probability} = \frac{\text{favourable}}{\text{Total}} = \frac{5}{14}$$

Q25. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears
(i) A two-digit number
(ii) A perfect square number
(iii) A number divisible by 5.

Sol. Discs numbered 1, 2, 3, ... 90

(i) Two digit numbers are 10, 11, 12, ... 90

$$\text{probability} = \frac{\text{favourable}}{\text{total}} = \frac{81}{90} = \frac{9}{10}$$

(ii) Perfect square numbers are 1, 4, 9, 16, 25, 36, 49, 64, 81

$$\text{probability} = \frac{9}{90} = \frac{1}{10}$$

(iii) Numbers divisible by 5 are 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90

$$\text{probability} = \frac{18}{90} = \frac{1}{5}$$

Q26. A box has cards numbered 14 to 99. Cards are mixed thoroughly and a card is drawn at random from the box. find the probability that the number on the card is (i) an odd number (ii) a number which is a perfect square.

Sol. Cards numbered 14, 15, 16, ... 99

Total numbers are 86 of which 43 are even and 43 are odd.

(i) odd numbers are 15, 17, 19, ... 99 which are 43 numbers

$$P = \frac{43}{86} = \frac{1}{2}$$

(ii) perfect square numbers are 16, 25, 36, 49, 64, 81

$$\text{probability} = \frac{\text{favourable}}{\text{total}} = \frac{6}{86} = \frac{3}{43}.$$

Q27. Cards marked with numbers 2 to 101 are placed in a box and mixed thoroughly. one card is drawn at random from this box. find the probability that the number on the card is (i) an even number (ii) a number lessthan 14. (iii) a number which is a perfect square (iv) a prime number lessthan 30.

Sol. Cards numbers are 2, 3, 4, ... 101

Total numbers are 100 of which 50 are even numbers and 50 are odd numbers.

(i) $P(\text{even}) = \frac{50}{100} = \frac{1}{2}$

(ii) numbers lessthan 14 are 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

$P(\text{lessthan } 14) = \frac{12}{100} = \frac{3}{25}$.

(iii) numbers which are perfect square are 4, 9, 16, 25, 36, 49, 64, 81, 100.

$P(\text{perfect square}) = \frac{9}{100}$

(iv) prime numbers lessthan 30 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

$P(\text{prime lessthan } 30) = \frac{10}{100} = \frac{1}{10}$

Q28. A bag contains 15 balls of which some are white and others are red. If the probability of drawing a red ball is twice that of a white ball, find the number of white balls in the bag.

Sol. Total balls = 15

let white balls = x then red balls = $15 - x$

$$P(\text{red}) = \frac{15-x}{15} \quad \text{and} \quad P(\text{white}) = \frac{x}{15}$$

According to the condition

$$P(\text{red}) = 2\,P(\text{white})$$

$$\frac{15-x}{15} = 2 \times \frac{x}{15} \Rightarrow 15 - x = 2x \Rightarrow 3x = 15$$

$$\Rightarrow x = 5$$

∴ white balls are 5.

Q29. A bag contains 6 red balls and some blue balls. If the probability of drawing a blue ball is twice that of red ball, find the number of blue balls in the bag.

Sol. No. of red balls = 6

let no. of blue balls = x

Total balls = $6 + x$

$$P(\text{blue}) = \frac{x}{6+x} \quad \text{and} \quad P(\text{red}) = \frac{6}{6+x}$$

According to Condition.

$$P(\text{blue}) = 2\,P(\text{red})$$

$$\frac{x}{6+x} = 2 \times \frac{6}{6+x} \Rightarrow x = 12$$

∴ The no. of blue balls are 12.

Q30. A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random from the jar, the probability that it is green is $\frac{2}{3}$. Find the number of blue marbles in the jar.

Sol. Total marbles = 24

let no. of green marbles = x

no. of blue marbles = $24 - x$

$P(\text{green}) = \frac{x}{24}$ and $P(\text{blue}) = \frac{24-x}{24}$

let is given $P(\text{green}) = \frac{2}{3}$

$\therefore \frac{x}{24} = \frac{2}{3} \Rightarrow x = 16$

Now, no. of blue marbles = $24 - x = 24 - 16 = 8$

Q31. A card is drawn from a well-shuffled pack of 52 cards. find the probability of getting:

(i) '2' of spades (ii) a jack (iii) a king or red colour (iv) a card of diamond (v) a king or a queen (vi) a non-face card (vii) a black face card (viii) a black card (ix) a non-ace (x) non-face card of black colour (xi) neither a spade nor a jack (xii) neither a heart nor a red king.

Sol. (i) total no. of cards = 52

There is one card of '2' spades

NO. of favourable = 1

$\Rightarrow$ probability (2 of spades) = $\frac{1}{52}$

(ii) There of 4 cards of jack

NO. of favourable outcomes = 4

$\Rightarrow$ probability (a jack) $= \frac{4}{52} = \frac{1}{13}$

(iii) There of 2 kings of red colour (one of heart and one of diamond)

No. of favourable outcomes $= 2$

$\Rightarrow$ probability $= \frac{2}{52} = \frac{1}{26}$

(iv) There are 13 cards of diamonds

No. of favourable outcomes $= 13$

$\Rightarrow$ probability $= \frac{13}{52} = \frac{1}{4}$

(v) There are 4 cards of king and 4 cards of queen.

No. of favourable outcomes $= 4 + 4 = 8$

$\Rightarrow$ probability $= \frac{8}{52} = \frac{2}{13}$

(vi) There of 3 face cards (king, queen, jack) of each suit

$\therefore$ Total no. of face cards $= 3 + 3 + 3 + 3 = 12$

We have to find probability of getting non face card

No. of non face cards, = Total no. of cards - face cards

$= 52 - 12 = 40$

$\therefore$ probability $= \frac{40}{52} = \frac{10}{13}$

(vii) There of 3 black-face card of spades and 3 black face card of club

Total no. of black face cards $= 3 + 3 = 6$

$\therefore$ probability $= \frac{6}{52} = \frac{3}{26}$

(viii) No. of black cards $= 26$

$\therefore$ probability $= \frac{26}{52} = \frac{1}{2}$

(ix) There of 4 ace cards

No. of non-ace card = 52 − 4 = 48

∴ probability = $\frac{48}{52} = \frac{12}{13}$.

(x) There are 3 black-faced cards of Spade and 3 black faced cards of club.

Total no. of black face cards = 3 + 3 = 6

Total no. of black cards = 26

No. of non-face black cards = 26 − 6 = 20

probability = $\frac{20}{52} = \frac{5}{13}$

(xi) There are 13 cards of Spades which contain 1 jack and also there are 3 more cards of jack of club, heart and diamond.

No. of favourable cases (neither a Spade nor a jack)

= 52 − 13 − 3 = 36

probability = $\frac{36}{52} = \frac{9}{13}$

(xii) There are 13 cards of heart including one red king and also there is 1 red king of diamond.

∴ No. of favourable cases (neither a heart nor a red king)

= 52 − 13 − 1 = 38

⇒ probability = $\frac{38}{52} = \frac{19}{26}$.

Q32. The king, queen and jack of clubs are removed from a deck of 52 playing cards and then shuffled. A card is drawn from the remaining cards. find the probability of getting: (i) a heart (ii) a queen (iii) a club (iv) '9' of red colour.

Sol. Total no. of cards = 52

No. of Cards removed (King, queen and jack of clubs) = 3

∴ remaining cards = 52 - 3 = 49

(i) There are 13 Cards of hearts.

∴ No. of favourable cases = 13

⇒ probability = $\frac{13}{49}$

(ii) There of 4 queens, but queen of clubs is remove

∴ No. of favourable cases = 4 - 1 = 3

⇒ probability = $\frac{3}{49}$

(iii) There of 13 cards of clubs but king, queen and jack of clubs are removed.

∴ No. of Cards of clubs = 13 - 3 = 10

⇒ probability = $\frac{10}{49}$

(iv) No. of 'a' of red colour = 2

⇒ probability = $\frac{2}{49}$.

Q33. Two different coins are tossed simultaneously. find the probability of getting: (i) two tails (ii) one tail (iii) no tail (iv) atleast one tail (v) atmost one tail

Sol. When two coins are tossed simultaneously the possible outcomes are (H,H), (H,T), (T,H), (T,T) all the outcomes are equally like.

Total no. of possible outcomes = 4

(i) No. of favourable cases to get two tails = 1 (T,T)

∴ probability = $\frac{1}{4}$

(ii) No. of favourable cases (H,T), (T,H)

probability = $\frac{2}{4} = \frac{1}{2}$

(iii) No. of favourable cases = 1 (H,H)

probability = $\frac{1}{4}$

(iv) (H,T), (T,H), (T,T) have atleast one tail.

No. of favourable cases = 3

$\therefore$ probability = $\frac{3}{4}$

(v) (H,H), (H,T), (T,H) have atmost one tail.

No. of favourable cases = 3

$\therefore$ probability = $\frac{3}{4}$.

Q34. Two different dice are thrown at the same time. find the probability of getting:

(i) a doublet (ii) a sum of 8 (iii) Sum divisible by 5 (iv) Sum of atleast 11

Sol. when two different dice are thrown, the total no. of outcomes are 36

(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)

(i) The outcomes favourable to event "a doublet" are
(1,1), (2,2), (3,3), (4,4), (5,5), (6,6)

No. of favourable cases = 6

probability $= \frac{6}{36} = \frac{1}{6}$

(ii) The favourable outcomes for event "a sum of 8" are (2,6), (3,5), (4,4), (5,3), (6,2)

no. of favourable cases = 5

probability $= \frac{5}{36}$

(iii) The favourable outcomes for event "sum divisible by 5" are (5,5), (4,6), (6,4), (3,2), (2,3), (4,1), (1,4)

No. of favourable cases = 7

probability $= \frac{7}{36}$

(iv) The favourable outcomes for event "sum atleast 11" are (6,5), (6,6), (5,6)

No. of favourable cases = 3

probability $= \frac{3}{36} = \frac{1}{12}$.