Exercise - 9.1

(1) You are walking alone a street. If you just choose a stranger crossing you, what is the probability that his next birthday will fall on a sunday?

⇒ Sample space $S = \{$sunday, monday, Tuesday, wednesday, Thursday, Friday, saturday$\}$

$\therefore n(S) = 7$

Let A be the event of the selecting sunday.

$\therefore n(A) = 1$

$\therefore$ probability of will fall on a sunday

$$= \frac{n(S)}{n(A)} = \frac{1}{7}.$$

Thus the required probability $= \frac{1}{7}$.

(2) What is the probability of drawing a king or a Queen or a Jack from a deck of cards?

⇒ ~~Sample space S =~~

Let S be be sample space.

then, $n(S) = 52$.

Let A, B, and C ~~be probabili~~ event of drawing a king or a queen or a Jack.

$\therefore n(A) = 4$, $n(B) = 4$, $n(C) = 4$.

$$\therefore P(A) = \frac{n(A)}{n(S)} = \frac{4}{52} = \frac{1}{13}$$

$$P(B) = \frac{n(B)}{n(S)} = \frac{4}{52} = \frac{1}{13}$$

$$P(C) = \frac{n(C)}{n(S)} = \frac{4}{52} = \frac{1}{13}$$

Thus, the probability of drawing a king or a Queen or a Jack

$$= P(A) + P(B) + P(C)$$

$$= \frac{1}{13} + \frac{1}{13} + \frac{1}{13}$$

$$= \frac{3}{13}.$$

(3) What is the probability of throwing an even number with a single standard dice of six faces?

⇒ Sample space $S = \{1, 2, 3, 4, 5, 6\}$.

$n(S) = 6$.

Let A be the event of throwing an even number with a single standard dice.

$\therefore$ ~~$n(A)$ $A = \{1, 3, 5\}$~~

$A = \{2, 4, 6\}$

$n(A) = 3$.

$\therefore$ probability of throwing an even number with a single standard dice of six faces.

$$P(A) = \frac{n(S)}{n(A)} = \frac{3}{6} = \frac{1}{2}$$

(4) There are 24 balls in a pot. If 3 of them are Red, 5 of them are Blue and the remaining are green then, what is the probality of picking out (i) a Blue ball, (ii) a Red ball and (iii) a green ball?

⇒ Let S be the sample space.

$\therefore n(S) = 24$

$\therefore$ Number of Red ball $= 3$

" " Blue " $= 5$

" " green " $= 24 - (3+5)$

$= 16$

(i) Let A be the event of getting a blue ball

$\therefore n(A) = 5$

$$P(A) = \frac{n(A)}{n(S)} = \frac{5}{24}$$

$\therefore A = \{\}$

$\therefore n(A) = 0$

$P(A) = \frac{n(A)}{n(S)} = \frac{0}{36} = 0$

Thus, the probability of the sum is equal to 1 is 0.

(ii) Let B be the event of getting the sum is equal to 4

$\therefore B = \{(1,3), (2,2), (3,1)\}$

$\therefore n(B) = 3$

$\therefore P(B) = \frac{n(B)}{n(S)} = \frac{3}{36} = \frac{1}{12}$

Thus, the probability of the sum is equal to 4 is $\frac{1}{12}$.

(iii) Let C be the event of getting the sum is less than 13.

$C = \{(1,1), (1,2), (1,3), (1,4), (1,5), (1,6), (2,1), (2,2), (2,3), (2,4), (2,5), (2,6), (3,1), (3,2), (3,3), (3,4), (3,5), (3,6), (4,1), (4,2), (4,3), (4,4), (4,5), (4,6), (5,1), (5,2), (5,3), (5,4), (5,5), (5,6), (6,1), (6,2), (6,3), (6,4), (6,5), (6,6)\}$

$n(C) = 36$

$\therefore P(C) = \frac{n(C)}{n(S)} = \frac{36}{36} = 1$

Therefore the probability of the sum is less than 13 is 1.

(ii) Let B be the event of getting a red ball.

$\therefore n(B) = 3$

then, $P(B) = \frac{n(B)}{n(S)} = \frac{3}{24} = \frac{1}{8}$

(iii) Let C be the event of getting a green ball.

$\therefore n(C) = 16$

then, $P(C) = \frac{n(C)}{n(S)} = \frac{16}{24} = \frac{8}{12} = \frac{2}{3}$

(5) When two coins are tossed, what is the probability that two heads are obtained?

⇒ Sample space(S) $\{HH, HT, T, H, TT\}$

$\therefore n(S) = 4$

Let A be the event of getting two heads.

$A = \{HH\}$

$\therefore n(A) = 1$

$\therefore P(A) = \frac{n(A)}{n(S)} = \frac{1}{4}$

(6) Two dice are rolled, find the probability that the sum is (i) equal to 1 (ii) equal to 4 (iii) less than 13.

⇒ Sample space $S = \{(1,1),(1,2),(1,3),(1,4),(1,5),(1,6),(2,1),(2,2),(2,3)$
$(2,4),(2,5),(2,6),(3,1),(3,2),(3,3),(3,4),(3,5),(3,6)$
$(4,1),(4,2),(4,3),(4,4),(4,5),(4,6),(5,1),$
$(5,2),(5,3),(5,4),(5,5),(5,6),(6,1),(6,2),$
$(6,3),(6,4),(6,5),(6,6).\}$

$\therefore n(S) = 36.$

(i) Let A be the event of getting the sum is equal to 1.

(1) A manufacturer tested 7000 LED lights at random and found that 25 of them were defective. If a LED light is selected at random, what is the probability that the selected LED light is a defective one.

⇒ Let S be the sample space

$\therefore n(S) = 7000$

Let A be the event of getting the selected LED light is a defective.

$\therefore n(A) = 25$

Probability of the selected LED light is a defective one is

$$P(A) = \frac{n(A)}{n(S)} = \frac{25}{7000} = \frac{1}{280}$$

Thus, the required probability is $\frac{1}{280}$.

(2) In a football match, a goalkeeper of a team can stop the goal 32 times out of 40 attempts tried by a team. Find the probability that the opponent team can convert the attempt into a goal.

⇒ Let S be the sample space.

$\therefore n(S) = 40.$

Opponent team goal = $40 - 32 = 8$

Let A be the event of getting the opponent team can convert the attempt into a goal

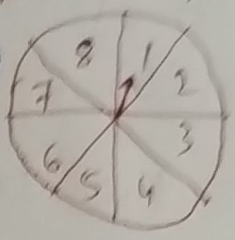
$n(A) = 8$

$$\therefore P(A) = \frac{n(A)}{n(S)} = \frac{8}{40} = \frac{1}{5}$$

Therefore the probability of the opponent team can convert the attempt into a goal is $\frac{1}{5}$.

(9) What is the probability that the spinner will not land on a multiple of 3?

⇒ Sample space $S = \{1,2,3,4,5,6,7,8\}$



$n(S) = 8$

Let A be the event of getting the spinner will not land on a multiple of 3.

$\therefore A = \{1,2,4,5,7,8\}$

$n(A) = 6.$

$\therefore P(A) = \frac{n(A)}{n(S)} = \frac{6}{8} = \frac{3}{4}$

Therefore, the probability of the spinner will not land on a multiple of 3 is $\frac{3}{4}$.

(10) Frame two problems in calculating probability based on the spinner shown here.

(i) What is the probability that the spinner will land on a multiple of 2.

(ii) What is the probability that the spinner will get a even number?