Exercise 7.5

For the following experiments, find the probability in each case:

Question # 1

Experiment:

From a box containing orange-flavoured sweets, Bilal takes out one sweet without looking.

Events happening:

(i) the sweet is orange-flavoured (ii) the sweet is lemon-flavoured

Solution Total possible outcomes = $n(S) = 1$

(i) Suppose A is the event that sweet is orange flavoured.

Since box only contained orange flavoured sweets

So favourable outcomes = $n(A) = 1$

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

(ii) Let B be the event that the sweet is lemon-flavoured.

Since box only contained orange-flavoured sweet

So favourable outcomes $= n(B) = 0$

Probability $= P(B) = \frac{n(B)}{n(S)} = \frac{0}{1} = 0$

Question # 2

Experiment:

Pakistan and India play a cricket match. The result is:

(i) Pakistan wins (ii) India does not lose.

Solution Since there are three possibilities that Pakistan wins, loses or the match tied.

Therefore possible outcomes = $n(S) = 3$

(i) Let A be the event that Pakistan wins

Favourable outcomes = $n(A) = 1$

Required probability = $P(A) = \frac{n(A)}{n(S)} = \frac{1}{3}$

(ii) Let B be the event that India does not lose.

If India does not lose then India may win or the match tied

Therefore favourable outcomes = $n(B) = 2$

Required probability = $P(B) = \frac{n(B)}{n(S)} = \frac{2}{3}$

Question # 3

Experiment:

There are 5 green and 3 red balls in a box, one ball is taken out.

Event happening

(i) the ball is green (ii) the ball is red

Solution Total number of balls $= 5 + 3 = 8$

Therefore possible outcomes $= n(S) = 8$

(i) Let A be event that the ball is green

Then favourable outcomes = $n(A) = 5$

So probability = $P(A) = \dfrac{n(A)}{n(S)} = \dfrac{5}{8}$

(ii) Let B be the event that the ball is red

Then favourable outcomes = $n(B) = 3$

So probability = $P(A) = \dfrac{n(B)}{n(S)} = \dfrac{3}{8}$

Question # 4

Experiment:

A fair coin is tossed three times. It shows

Event happening

(i) One tail (ii) atleast one head

Solution When a fair coin is tossed three times, the possible outcomes are

HHH, HHT, HTH, THH, HTT, THT, TTH, TTT.

So total possible outcomes = $n(S) = 8$

(i) Let A be the event that the coin shows one tail then favourable outcomes are HHT, HTH, THH,

i.e. $n(A) = 3$

So required probability = $P(A) = \dfrac{n(A)}{n(S)} = \dfrac{3}{8}$

(ii) Let B be the event that coin shows at least one head then favourable outcomes are

HHH, HHT, HTH, THH, HTT, THT, TTH.

i.e. $n(B) = 7$

So required probability = $P(B) = \dfrac{n(B)}{n(S)} = \dfrac{7}{8}$

Question # 5

Experiment:

A die is rolled. The top shows

Event happening

(i) 3 or 4 dots (ii) dots less than 5

Solution The possible outcomes are that die show 1, 2, 3, 4, 5, 6.

So possible outcomes = $n(S) = 6$

(i) Let A be the event that die show 3 or 4.

Then favourable outcomes = $n(A) = 2$

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

(ii) Let B be the event that top of the die show dots less than 5 then
Favourable outcomes = $n(B) = 4$

So required probability = $P(B) = \frac{n(B)}{n(S)} = \frac{4}{6} = \frac{2}{3}$

Question # 6

Experiment:

From a box containing slips numbered $1, 2, 3, ..., 5$ one slip is picked up

Event happening

(i) The number on the slip is a prime number

(ii) The number on the slip is a multiple of 3.

Solution Since the box contain 5 slips
So possible outcomes = $n(S) = 5$

(i) Let A be the event that the number on the slip are prime numbers 2, 3 or 5
Then favourable outcomes = $n(A) = 3$

So required probability = $P(A) = \frac{n(A)}{n(S)} = \frac{3}{5}$

(ii) Let B be the event that number on the slips are multiple of 3 then
Favourable outcomes = $n(B) = 1$

So probability = $P(B) = \frac{n(B)}{n(S)} = \frac{1}{5}$

Question # 7

Experiment:

Two dice, one red and the other is blue, are rolled simultaneously. The numbers of dots on the tops are added. The total of the two scores is:

Event happening

(i) 5 (ii) 7 (iii) 11

Solution When two dice are rolled, the possible outcomes are

(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)

This show possible outcomes = $n(S) = 36$

(i) Let A be the event that the total of two scores is 5 then favourable outcome are
(1, 4), (2, 3), (3, 2), (4, 1)
i.e. favourable outcomes = $n(A) = 4$

So required probability = $P(A) = \frac{n(A)}{n(S)} = \frac{4}{36} = \frac{1}{9}$

(ii) Let B be the event that the total of two scores is 7 then favourable outcomes are

(1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1)

i.e. favourable outcomes = $n(B) = 6$

So probability = $P(B) = \frac{n(B)}{n(S)} = \frac{6}{36} = \frac{1}{6}$

(iii) Let C be the event that the total of two score is 11 then favourable outcomes are (5, 6), (6, 5) i.e. $n(C) = 2$

So probability = $P(B) = \frac{n(B)}{n(S)} = \frac{2}{36} = \frac{1}{18}$

Question # 8

Experiment:

A bag contain 40 balls out of which 5 are green, 15 are black and the remaining are yellow, A ball is taken out of the bag.

Event happening

(i) The ball is black (ii) The ball is green (iii) The ball is not green.

Solution Total number of balls = 40 i.e. $n(S) = 40$

Black balls = 15, Green balls = 5, Yellow balls = 40 – (15+5) = 20

(i) Let A be the event that the ball is black then $n(A) = 15$

So required probability = $P(A) = \frac{n(A)}{n(S)} = \frac{15}{40} = \frac{3}{8}$

(ii) Let B denotes the event that the ball is green then $n(B) = 5$

So required probability = $P(B) = \frac{n(B)}{n(S)} = \frac{5}{40} = \frac{1}{8}$

Let C denotes the event that the ball is not green then ball is either black or yellow therefore favourable outcomes = $n(C) = 15 + 20 = 35$

So required probability = $P(C) = \frac{n(C)}{n(S)} = \frac{35}{40} = \frac{7}{8}$

Question # 9

Experiment:

One chit out of 30 containing the names of 30 students of a class of 18 boys and12 girls is taken out at random, for nomination as the monitor of the class.

Event happening

(i) The monitor is the boy (ii) The monitor is the girl.

Solution Number of students = 30

Then possible outcomes = $n(S) = 30$

(i) Now if A be the event that the monitor is the boy then
Favourable outcomes = $n(A) = 18$

So probability = $P(A) = \frac{n(A)}{n(S)} = \frac{18}{30} = \frac{3}{5}$

(ii) Now if B be the event that the monitor is the girl then
Favourable outcomes = $n(B) = 12$

So probability = $P(B) = \frac{n(B)}{n(S)} = \frac{12}{30} = \frac{2}{5}$

Question # 10

Experiment:

A coin is tossed four times. The top show

Event happening

(i) All heads (ii) 2 head and 2 tails.

Solution When the coin is tossed four times the possible outcomes are

HHHT	HHTH	HTHH	THHH
HHTT	HTTH	TTHH	THHT
HTTT	TTTH	TTHT	THTT
TTTT	HHHH	THTH	HTHT

i.e. $n(S) = 16$

(i) Let A be the event that the top shows all head then
favourable outcome is HHHH i.e. $n(A) = 1$

Now probability = $P(A) = \frac{n(A)}{n(S)} = \frac{1}{16}$

(ii) Let B be the event that the top shows 2 head and two tails the favourable outcomes are HHTT, HTTH, TTHH, THHT, THTH, HTHT

i.e. $n(B) = 6$

Now probability = $P(B) = \frac{n(B)}{n(S)} = \frac{6}{16} = \frac{3}{8}$
