Chapter 25. Probability

Exercise 25.1

1.) A coin is tossed 1000 times with the following sequence:
Head: 445 , Tail: 545
Compute the probability of each event.

→ Here, coin is tossed 1000 times.
Let 'E'-be the event of getting head and
'F'-be the event of getting tail.

Then, $\begin{pmatrix}\text{no. of favorable}\\ \text{outcomes}\end{pmatrix} = \begin{pmatrix}\text{no. of trials}\\ \text{included in E}\end{pmatrix} = 455$

Thus, $P(E) = \frac{(\text{no. of favorable outcomes})}{\text{total outcomes}}$

$P(E) = 455/1000 = 0.455$

Thus, $(\text{no. of favorable outcomes}) = \begin{pmatrix}\text{no. of trials}\\ \text{included in F}\end{pmatrix} = 545$

$P(F) = 545/1000 = 0.545$

Thus, $\boxed{P(E) = 0.455}$ and $\boxed{P(F) = 0.545}$

2.) Two coins are tossed simultaneously 500 times with the following frequencies of different outcomes.
Two heads: 95 times
One tail: 290 times
No head: 115 times.
find the probability of occurence of each of these events.

→ Probability of an event $= \frac{(\text{no. of favorable outcomes})}{(\text{total no. of outcomes})}$

Here, Total no. of trials $= 95 + 290 + 115 = 500$

Then,

P(getting two heads) = $\frac{95}{500}$ = 0.19

P(getting one tail) = $\frac{290}{500}$ = 0.58

P(getting no head) = 115/500 = 0.23

3.) Three coins are tossed simultaneously 100 times with the following frequencies of different outcomes:

outcome	No head	One head	Two heads	Three heads
frequency	14	38	36	12

If the three coins are simultaneously tossed again, compute the probability of:

i) 2 heads coming up
ii) 3 heads coming up
iii) At least one head coming up
iv) getting more heads than tails
v) getting more tails than heads

→ We have,

Probability of any event = $\frac{\text{(no. of favorable outcomes)}}{\text{(total no. of outcomes)}}$

Here, The total no. of outcomes = 100

i) P(getting 2 heads) = 36/100 = 0.36

ii) P(getting 3 heds) = 12/100 = 0.12

iii) P(getting at least one head) = (38+36+12)/100
= 86/100 = 0.86

iv) P(getting more heads than tails) = (36+12)/100 = 48/100
= 0.48

v) P(getting more tails than heads) = (14+38)'/100
= 52/100
= 0.52

4) 1500 families with 2 children were selected randomly, and the following data were recorded.

No. of girls in a family	0	1	2
No. of girls	211	814	475

If a family is chosen at random, compute the probability that it has:

i) No girl ii) 1 girl iii) 2 girls iv) At most one girl

v) more girls than boys.

→ We have,

$$\text{Probability of an event} = \frac{\text{(total no. of favorable outcomes)}}{\text{(total outcomes)}}$$

Here, total no. of outcomes = 211 + 814 + 475 = 1500

i) P(getting no girl) = 211/1500 = 0.1406

ii) P(getting 1 girl) = 814/1500 = 0.5426

iii) P(getting 2 girls) = 475/1500 = 0.3166

iv) P(getting at most 1 girl) = (211 + 814)/1500

= 1025/1500 = 0.6833

v) P(getting more girls than boys) = 475/1500 = 0.31

5) In a cricket match, a batsman hits a boundary 6 times out of 30 balls he plays. Find the probability that on a ball played:

i) He hits boundary ii) He does not hit a boundary

→ Here, the total no. of balls played by the player } = 30

Number of times he hits a boundary = 6

No. of time he does not hits a boundary = 30 − 6 = 24

We have, Probability of an event = $\frac{\text{(no. of favorable outcomes)}}{\text{total outcomes}}$

i) P (player hits boundary) = 6/30 = 1/5 = 0.2

ii) P (batsman does not hit boundary) = 24/30 = 4/5 = 0.8

6.) The percentage of marks obtained by a student in monthly unit tests are given below:

Unit Test	I	II	III	IV	V
% of marks obtained	69	71	73	68	76

Find the probability that the students gets

i) more than 70% marks

ii) less than 70% marks

iii) A distinction

→ Here, Total no. of unit tests taken = 5

We have, Probability of an event = $\frac{\text{(total favorable outcomes)}}{\text{(total outcomes)}}$

i) The total students got more than 70% = 3

P (getting more than 70%) = 3/5 = 0.6

ii) The total students got less than 70% = 2

P (getting less than 70%) = 2/5 = 0.4

iii) The total students got a distinction = 1 (% > 75%)

P (getting a distinction) = 1/5 = 0.2

7) To know the opinion of the students about mathematic a survey of 200 students were conducted.
The data was recorded in the following table:

opinion	like	dislike
No. of students	135	65

Find the probability that the student chosen at random
i) like mathematics
ii) does not like it

→ Here, total no. of students = 200
Students who likes maths = 135
Students who does not like maths = 65.

we have,

$$\text{Probability of an event} = \frac{\text{(total no. of favorable outcomes)}}{\text{total outcomes}}$$

i) $P(\text{getting students who likes mathematics}) = 135/200$
$= 0.675$

ii) $P(\text{getting students who does not like mathematics}) = 65/200$
$= 0.325$