

HOTS (Higher Order Thinking Skills)

Que 1. In cricket match, a batsman hits a boundary 12 times out of 48 balls he plays. Find the probability that he does not hit a boundary in the next ball.

Sol. Let E be the event ‘the batsman hits a boundary’.

Then, $\bar{E}$ is the event ‘the batsmen does hit a boundary’.

$$\therefore P(E) = \frac{12}{48} = \frac{1}{4}$$

$$\Rightarrow P(\bar{E}) = 1 - P(E) = 1 - \frac{1}{4} = \frac{3}{4}$$

Que 2. An Insurance company selected 2000 drivers at random in a particular city to find a relationship between age and accidents. The data obtained are given in the following table:

Age of drivers (in years)	Accidents in one year				
	0	1	2	3	Over 3
18 – 29	440	160	110	61	35
30 – 50	505	125	60	22	18
Above 50	360	45	35	15	9

Find the probabilities of the following events for a driver chosen at random from the city:

(i) Being 18-29 years of age having exactly 3 accidents in one years.

(ii) Being 30-50 years of age and having one or more accidents in a years.

(iii) Having no accident in one years.

Sol. Total number of drivers = 2000

(i) Number of drivers who are 18-29 years old and have exactly 3 accidents in one years is 61

$$\begin{aligned}\text{So, } P(\text{driver is 18-29 years old with exactly 3 accidents}) &= \frac{61}{2000} \\ &= 0.0305 \approx 0.031\end{aligned}$$

(ii) Number of drivers having 30-50 years of age and having one or more accidents in one year
= 125 + 60 + 22 + 18 = 225

So, P (driver is 30-35 years of age and having one or more accidents)

$$= \frac{225}{2000} = 0.1125 = 0.113$$

(iii) Number of drivers having no accident in one year = 440 + 505 + 360
= 1305

So, $P(\text{drivers with no accident}) = \frac{1305}{2000} = 0.6525 = 0.653$

Que 3. The percentage of marks obtained by a student in monthly unit tests are given below.

Test	I	II	III	IV	V	VI
percentage of marks	52	60	65	75	80	72

Find the probability that in the next test the student gets

(i) more than 70% marks, (ii) less than 70% marks,

(iii) at least 60% marks.

Sol. (i) Number of tests in which the student scored more than 70% marks = 3

$$\therefore P(\text{more than 70\% marks}) = \frac{3}{6} = \frac{1}{2}$$

(ii) Number of tests in which the student scored less than 70% marks = 3

$$\therefore P(\text{less than 70\% marks}) = \frac{3}{6} = \frac{1}{2}$$

(iii) Number of tests in which the student scored at least 60% marks = 5

$$\therefore P(\text{at least 60\% marks}) = \frac{5}{6}$$