

Chapter :- 15

Probability

Ex :- 15.1

Ques (1) Complete the following statements:-

(i) Probability of an event E + Probability of the event not $E = 1$ (one)

(ii) The probability of an event that cannot happen is 0, such an event is called impossible event

(iii) The probability of an event that is certain to happen is 1. Such an event is called sure or certain event

(iv) The sum of the probabilities of all the elementary events of an experiment is 1

(v) The probability of an event is greater than or equal to 0 and less than or equal to 1

Ques (4) Which of the following cannot be the probability of an event:

- (a) $\frac{2}{3}$ (b) -1.5 (c) 15% (d) 0.7

Ans. -1.5

Ques 5) If $P(E) = 0.05$ What is the Probability of not E ?

Ans: $P(E) = 0.05$
 $= 1 - P(E)$
 $= 1 - 0.05$
 $= \boxed{0.95}$

$$\begin{array}{r} 1.00 \\ - 0.05 \\ \hline 0.95 \end{array}$$

Ques 6) A bag contains lemon flavoured candies only. ~~that is~~ the Malni takes out one candy without looking into the bag. What is the probability that she takes out.

(i) an orange flavoured candy?

Ans: Orange flavoured candy = 0

(ii) A lemon flavoured candy?

Ans: Lemon flavoured candy = 1

Ques 7) It is given that in a group of 3 students, the probability of 2 students not having the same birthday is 0.992. What is the probability that the 2 students have the same birthday?

Ans:- $P(E) = 0.992$

$$P(E) = 1 - 0.992 \Rightarrow 0.008$$

Ques 8) 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 drawn is (i) red (ii) not red?

Total No. of balls = $3+5=8$

Ans: (i) Red balls :-
$$\frac{\text{No. of favourable cases}}{\text{Total No. of cases}} = \frac{3}{8}$$

(ii) probability of getting not red ball

$$1 - \frac{3}{8} = \frac{8-3}{8} = \frac{5}{8}$$

Ques: 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

Total No. of marble = $5+8+4=17$

(i) Red

Ans: Red marble =
$$\frac{\text{No. of favourable cases}}{\text{Total No. of cases}} = \frac{5}{17}$$

(ii) white

Ans:
$$\frac{8}{17}$$

(iii) not green?

Ans:
$$\frac{4}{17}$$

$$1 - \frac{4}{17}$$

$$= \frac{17-4}{17} = \frac{13}{17}$$

Ques 10) A piggy bank contains hundred 50p coins, fifty coins, twenty ₹2 coins and ten ₹5 coins. It is equally likely that one of the coins will fall out when the bank is turned upside down. What is the probability that the coin.

(i) will be a 50p coin?

Ans:- Total No. of coins = $100 + 50 + 20 + 10 = 180$

$$\text{50 p coin} = \frac{50}{180} = \frac{5}{18}$$

(ii) No. of ₹5 coins = 10

$$\frac{10}{180} = \frac{1}{18}$$

$$\text{Not a coin of ₹5} = 1 - \frac{1}{18}$$

$$\frac{18-1}{18} = \frac{17}{18}$$

Ques 11) Gopi buys a fish from shop for his aquarium. The shopkeeper takes out one fish at random from a tank containing 5 male fish and 8 female fish. What is the probability that the fish taken out is a male fish.

Ans:- Total No. of fishes = $5 + 8 = 13$

No. of male fishes = 5

$$P(e) = \frac{\text{No. of favourable cases}}{\text{Total no. of cases}}$$

$$= \frac{5}{13}$$

Example 2 A game of chance consists of spinning an arrow which comes to rest pointing at one of the 16, 3, 2, 4, 5, 6, 7, 8, and these are equally likely outcomes. What is the probability that it will point at 8?

Sol: Total No. of points = 8 (1, 2, 3, 4, 5, 6, 7, 8)
Arrow will point 8 = $\frac{\text{No. of favourable cases}}{\text{Total no. of cases}}$

$$= \frac{1}{8}$$

iii) an odd No.?

Sol: odd No. = 1, 3, 5, 7
= 4

$$= \frac{4}{8} = \frac{1}{2}$$

iv) No. greater than 2?

Sol: Points greater than 2 = 3, 4, 5, 6, 7, 8
= 6

$$\frac{6}{8} = \frac{3}{4}$$

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

No. of male fishes = 5

$$P(e) = \frac{\text{No. of favourable cases}}{\text{total No. of cases}}$$

$$= \frac{5}{13}$$

Ques 12) A game of chance consists of spinning an arrow which comes to rest pointing at one of the No. 1, 2, 3, 4, 5, 6, 7, 8, and these are equally likely outcomes. What is the probability that it will point at:

(i) 8?

Ans: Total No. of points = 8 (1, 2, 3, 4, 5, 6, 7, 8)
Arrow will point 8 = $\frac{\text{No. of favourable case}}{\text{total No. of case}}$

$$= \frac{1}{8}$$

iii) an odd No.?

Ans: odd No. = 1, 3, 5, 7
= 4

$$= \frac{4}{8} = \frac{1}{2}$$

iii) A No. greater than 2?

Ans: Points greater than 2 = 3, 4, 5, 6, 7, 8
= 6

$$\frac{6}{8} = \frac{3}{4}$$

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

(iv) A No. less than 9?
Ans: No. less than 9 = 1, 2, 3, 4, 5, 6, 7, 8
= 8

$$\frac{8}{8}$$

$$= 1.$$

Ques (13) A die is thrown once. find the probability of getting

(i) A Prime No.

Ans: Prime No. = 2, 3, 5 (1, 2, 3, 4, 5, 6)
= 3

$$\frac{3}{6} = \frac{1}{2}$$

(ii) A No. lying between 2 and 6

Ans: No. lying between 2 and 6 = 3, 4, 5
 $= \frac{3}{6} = \frac{1}{2}$

(iii) an odd No.

Ans: odd No. = 1, 3, 5
 $= \frac{3}{6}$
 $= \frac{1}{2}$

Ques (14) One card is drawn from a well shuffled deck of 52 cards. find the probability of getting

(i) A King of red colour

Ans: Total No. of cards = 52
A King of red colour = 2

$$\frac{\text{No. of favourable cases}}{\text{Total no. of cases}} = \frac{2}{52} = \frac{1}{26}$$

(ii) A face card

$$\frac{12}{52} = \frac{3}{13}$$

(iii) A red face card

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

(iv) The ace of hearts?

$$\frac{1}{52}$$

(v) a spade

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

(vi) The queen of diamonds?

$$\frac{1}{52}$$

Ques (15) Five cards - the ten, Jack, queen, king and ace of diamonds are well-shuffled with their face downwards. One card is then picked up at random.

(i) What is the probability that the card is the queen?

Ans: Total No. of cards shuffled = 5

$$\text{Queen Card} = \frac{1}{5}$$

(ii) If the queen is drawn and put aside. What is the probability that the second card picked up is (a) an ace (b) a queen?

Ans:- Total No. of cards = $5-1=4$

(i) No. of ace card = $\frac{1}{4}$

(ii) There is no queen card = 0

Ques 16) 12 defective pens are accidentally mixed with 132 good pens. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good pen.

Ans:- Total No. of pens = $12+132=144$

Total No. of possible outcomes = 144

No. of good pens = 132

Now, $P(E) = \frac{\text{No. of favourable cases}}{\text{Total No. of cases}}$

$$= \frac{132}{144} = \frac{11}{12}$$

Ques 17) A lot of 20 bulbs contain 4 defective ones. One bulb drawn at random from the lot. What is the probability that this bulb is defective?

Total No. of bulbs = 20

No. of defective bulbs = 4

$$P(\text{getting a defective bulb}) = \frac{4}{20} = \frac{1}{5} \text{ Ans}$$

Q. Suppose the bulb drawn in (i) is not defective and is not replaced now one bulb is drawn at random from the rest what is the probability that this bulb is not defective?

$$\begin{aligned} \text{Ans: Total No. of remaining bulbs} &= 20 - 1 = 19 \\ \text{No. of non defective} &= 16 - 1 = 15 \\ &= \frac{15}{19} \end{aligned}$$

Q. 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 no.

$$\text{Total No. of discs} = 90$$

$$\text{Ans: (i) A two digit no.} = 90 - 9 = 81$$

$$\frac{81}{90}$$

(ii) A perfect square No.

$$\begin{aligned} \text{Ans: A perfect square No.} &= 4, 9, 16, 25, 36, 49, 64, 81 \\ &= \frac{8}{90} = \frac{1}{10} \end{aligned}$$

(iii)

A No. divisible by 5

Ans:-

A No. divisible by 5 = (5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90)

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

Ques 19) A child has a die whose six faces are shown the letters as given below:-



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

Ans:- (i) $A = \frac{2}{6} = \frac{1}{3}$

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

Ques 20) Suppose you drop a die at random on the rectangular region. What is the probability that it land inside the circle with diameter 1m?



Ans:- Area = $3 \times 2 = 6 \text{ m}^2$
radius = $\frac{1}{2} \text{ m}$

DATE: / / 20
PAGE No 53

$$\text{area of circle} = \pi r^2$$

$$= \pi \times \left(\frac{1}{2}\right)^2 = \frac{\pi}{4} \text{ m}^2$$

$$P = \frac{\frac{\pi}{4}}{6}$$

$$\frac{\pi}{4} \times \frac{1}{6} = \frac{\pi}{24}$$

Ques 20 :- A lot consists of 144 balls pens of which 20 are defective and the others are good. Huri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that
(i) she will buy it? (ii) she will not buy it?

Ans:- Total pens = 144

Defective pens = 20

good pens = $144 - 20 = 124$

$$\frac{124}{144} = \frac{31}{36}$$

(ii) Defective pens = 20

$$= \frac{20}{144} = \frac{5}{36}$$

Ques 21 :- A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Hanif wins if all the tosses give the same result i.e., three heads or three tails and loses otherwise. Calculate the probability that Hanif will lose the game.

Ans:- For 3 coins:- (HHH), HTH, THH, TTH, HHT, HTT, THT, TTT

$$\frac{6}{8} = \frac{3}{4}$$

Ques 25) Which of the following arguments are correct and which are not correct? Give reasons for your answer.

(i) If two coins are tossed simultaneously there are possible outcomes - two heads two tails or one of each. Therefore for each of these outcomes the probability is $\frac{1}{3}$.

Ans:- Two coins = HH, HT, TH, TT
Probability of each outcome is not $\frac{1}{3}$.

(ii) If a die is thrown, there are two possible outcomes an odd No. of an even No. Therefore, the probability of getting an odd no. is $\frac{1}{2}$.

Ans:- odd No. (1, 3, 5) even No. (2, 4, 6)

$$= \frac{3}{6}$$

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