NCERT Solutions For Class 10 Maths Chapter 15 Probability Exercise 15.1

Exercise 15.1

Q1. Complete the statements:

(i) Probability of event E + Probability of event "not E" = _____

(ii) The probability of an event that cannot happen is _____. Such an event is called _____.

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

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

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

Ans. (i) 1

(ii) 0, impossible event

(iii) 1, sure or certain event

(iv) 1

(v) 0, 1

Q2. Which of the following experiments have equally likely outcomes? Explain.

(i) A driver attempts to start a car. The car starts or does not start.

(ii) A player attempts to shoot a basketball. She/he shoots or misses the shot.

(iii) A trial is made to answer a true-false question. The answer is right or wrong.

(iv) A baby is born. It is a boy or a girl.

Ans. (i) In the experiment, "A driver attempts to start a car. The car starts or does not start", we are not justified to assume that each outcome is as likely to occur as the other. Thus, the experiment has no equally likely outcomes.

(ii) In the experiment, "A player attempts to shoot a basketball. She/he shoots or misses the shot", we are not justified to assume that each outcome is as likely to occur as the other. Thus, the experiment has no equally likely outcomes.

(iii) In the experiment "A trial is made to answer a true-false question. The answer is right or wrong." We know, in advance, that the result can lead in one of the two possible ways – either right or wrong. We can reasonably assume that each outcome, right or wrong, is likely to occur as the other. Thus, the outcomes right or wrong are equally likely.

(iv) In the experiment, "A baby is born, It is a boy or a girl". We know, in advance that the outcome can lead in one of the two possible outcomes – either a boy or a girl. We are justified to assume that each outcome, boy or girl, is likely to occur as the other. Thus, the outcomes boy or girl are equally likely.

Q3. Why is tossing a coin considered to be a fair way of deciding which team should get the ball at the beginning of a football game?

Ans. The tossing of a coin is considered to be a fair way of deciding which team should get the ball at the beginning of a football game as we know that the tossing of the coin only land in one of two possible ways – either head up or tail up. It can reasonably be assumed that each outcome, head or tail, is as likely to occur as the other, i.e., the outcomes head and tail are equally likely. So the result of the tossing of a coin is completely unpredictable.

Q4. Which of the following cannot be the probability of an event:

(A) $\frac{2}{3}$

(B) -1.5

(C) 15%

(D) 0.7

Ans. (B) Since the probability of an event E is a number P(E) such that

$0 \leq P(E) \leq 1$

$\therefore -1.5$ cannot be the probability of an event.

Q5. If P(E) = 0.05, what is the probability of 'not E'?

Ans. Since P(E) + P (not E) = 1

$\therefore$ P (not E) = 1 – P(E) = 1 – 0.05 = 0.95

Q6. A bag contains lemon flavoured candles only. Malini takes out one candy without looking into the bag. What is the probability that she takes out:

(i) an orange flavoured candy?

(ii) a lemon flavoured candy?

Ans. (i) Consider the event related to the experiment of taking out of an orange flavoured candy from a bag containing only lemon flavoured candies. Since no outcome gives an orange flavoured candy, therefore, it is an impossible event so its probability is 0.

(ii) Consider the event of taking a lemon flavoured candy out of a bag containing only lemon flavoured candies. This event is a certain event so its probability is 1.

Q7. 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. Let E be the event of having the same birthday

$\Rightarrow$ P(E) = 0.992

But $P(E) + P(\overline{E}) = 1$

$\therefore P(\overline{E}) = 1 - P(E) = 1 - 0.992 = 0.008$

Q8. 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?

Ans. There are 3 + 5 = 8 balls in a bag. Out of these 8 balls, one can be chosen in 8 ways.

$\therefore$ Total number of elementary events = 8

(i) Since the bag contains 3 red balls, therefore, one red ball can be drawn in 3 ways.

$\therefore$ Favourable number of elementary events = 3

Hence P (getting a red ball) = $\frac{3}{8}$

(ii) Since the bag contains 5 black balls along with 3 red balls, therefore one black (not red) ball can be drawn in 5 ways.

$\therefore$ Favourable number of elementary events = 5

Hence P (getting a black ball) = $\frac{5}{8}$

Q9. 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:

(i) red?

(ii) white?

(iii) not green?

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