NTSE

NCERT Solutions for Class 10
MATHS – Probability

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1. Complete the following statements:

(i) Probability of an event E + Probability of the 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 happens is _____. Such as 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 event or certain event   (iv) 1   (v) 0, 1

2. 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) It is not equally likely event, as it depends on various factors such as whether the car will start or not. And factor for both the conditions are not the same.

(ii) It is not an equally likely event, as it depends on the player's ability and there is no information given about that.

(iii) It is an equally likely event.

(iv) It is an equally likely event.

3. 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.: When we toss a coin, the possible outcome are only two, head or tail, which are equally likely outcomes. Therefore, the result of an individual toss is completely unpredictable.

4.   Gopi buys a fish from a shop for his aquarium. The shopkeeper takes out one fish at random from a tank containing 5 male fish and 8 female fish (see the given figure).

What is the probability that the fish taken out is a male fish?
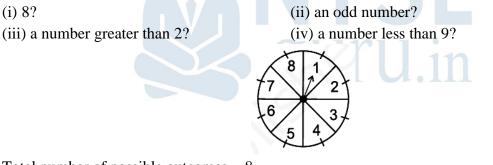
Ans.:   Total number of fishes in a tank

= Number of male fishes + Number of female fishes

= 5 + 8 = 13

Probability of getting a male fish $= \dfrac{\text{Number of favourable outcomes}}{\text{Number of total possible outcomes}}$
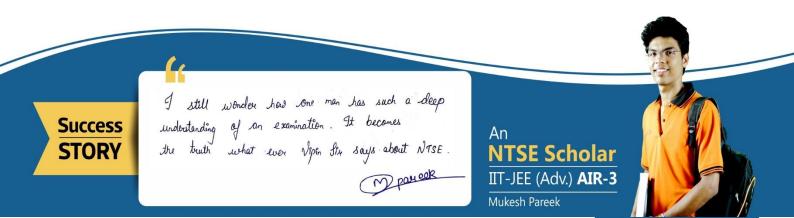
$= \dfrac{5}{13}$

5.   A game of chance consists of spinning an arrow which comes to rest pointing at one of the number 1, 2, 3, 4, 5, 6, 7, 8 (see the given figure), and these are equally likely outcomes. What is the probability that it will point at

(i) 8?   (ii) an odd number?

(iii) a number greater than 2?   (iv) a number less than 9?

Ans.:   Total number of possible outcomes = 8

(i) Probability of getting 8 $= \dfrac{\text{Number of favourable outcomes}}{\text{Number of total possible outcomes}} = \dfrac{1}{8}$

(ii) Total number of odd numbers on spinner = 4

Probability of getting an odd number $= \dfrac{\text{Number of favourable outcomes}}{\text{Number of total possible outcomes}}$

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

(iii) The numbers greater than 2 are 3, 4, 5, 6, 7, and 8.

Therefore, total numbers greater than 2 = 6

Probability of getting a number greater than 2 $= \dfrac{\text{Number of favourable outcomes}}{\text{Number of total possible outcomes}}$

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

(iv) The numbers less than 9 are 1, 2, 3, 4, 6, 7, and 8.

Therefore, total numbers less than 9 = 8

Probability of getting a number less than 9 $= \dfrac{8}{8} = 1$

6. A die is thrown once. Find the probability of getting
(i) a prime number;
(ii) a number lying between 2 and 6;
(iii) an odd number.

Ans.: The possible outcomes when a dice is thrown = {1, 2, 3, 4, 5, 6}

Number of possible outcomes of a dice = 6

(i) Prime numbers on a dice are 2, 3 and 5.

Total prime numbers on a dice = 3

Probability of getting a prime number $= \dfrac{3}{6} = \dfrac{1}{2}$

(ii) Numbers lying between 2 and 6 = 3, 4, 5

Total numbers lying between 2 and 6 = 3

Probability of getting a number lying between 2 and 6 $= \dfrac{3}{6} = \dfrac{1}{2}$

(iii) Odd numbers on a dice = 1, 3, and 5

Total odd numbers on a dice = 3

Probability of getting an odd number $= \dfrac{3}{6} = \dfrac{1}{2}$

7. 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 ?

(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.: (i) Total number of cards = 5

Total number of queens = 1

$$\text{P(getting a queen)} = \frac{\text{Number of favourable outcomes}}{\text{Number of total possible outcomes}}$$

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

(ii) When the queen is drawn and put aside, the total number of remaining cards will be 4.

(a) Total number of aces = 1

$$\text{P(getting an ace)} = \frac{1}{4}$$

(b) As queen is already drawn, therefore, the number of queens will be 0.

$$\text{P(getting a queen)} = \frac{0}{4} = 0$$

8. 12 defective pens are accidentally mixed with 132 good ones. 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 one.

Ans.: Total number of pens = 12 + 132 = 144

Total number of good pens = 132

$$\text{P(getting a good pen)} = \frac{\text{Number of favourable outcomes}}{\text{Number of total possible outcomes}}$$

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

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

(ii) 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?

Ans.: (i) Total number of bulbs = 20

Total number of defective bulbs = 4

$$\text{P(Getting a defective bulb)} = \frac{\text{Number of favourable outcomes}}{\text{Number of total possible outcomes}}$$

$$= \frac{4}{20} = \frac{1}{5}$$

(ii) Remaining total number of bulbs = 19

Remaining total number of non-defective bulbs = 16 – 1 = 15

P(getting a not defective bulb) $= \dfrac{15}{19}$

10. 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 number   (ii) a perfect square number   (iii) a number divisible by 5

Ans.: Total number of discs = 90

(i) Total number of two-digit numbers between 1 and 90 = 81

P(getting a two-digit number) $= \dfrac{81}{90} = \dfrac{9}{10}$

(ii) Perfect squares between 1 and 90 are 1, 4, 9, 16, 25, 36, 49, 64 and 81.

Therefore, total number of perfect squares between 1 and 90 is 9.

P(getting a perfect square) $= \dfrac{9}{90} = \dfrac{1}{10}$

(iii) Numbers that are between 1 and 90 and divisible by 5 are 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, and 90. Therefore, total numbers divisible by 5 = 18.

Probability of getting a number divisible by 5 $= \dfrac{18}{90} = \dfrac{1}{5}$

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