

Exercise

Question 1

A die is thrown, find the probability of getting:

(i) A prime number

Solution:-

A die has six numbers: 1, 2, 3, 4, 5, 6

No. of possible outcomes = 6

We know that

Number of favorable outcomes = a prime number = 1, 3, 5 which are 3 in numbers (Formula)

Here

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{3}{6} = \frac{1}{2}$$

(ii) A number greater than 4

Solution:-

We know that

No. of favorable outcome = Greater than four i.e. two number 5 and 6

Here

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{2}{6} = \frac{1}{3}$$

(iii) A number not greater than 4.

Solution:-

We know that

Number of favorable outcome = not greater than 4 or numbers will be 1,2,3,4 which are 4 in numbers

Here

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{4}{6} = \frac{2}{3}$$

Question 2.

A coin is tossed. What is the probability of getting

(i) A tail?

Solution:-

On tossing a coin once,

No. of possible outcome = 2

(i) Favorable outcome getting a tail = 1

No. of favorable outcome =2

We know that

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{1}{2}$$

(ii) a head?

Solution:-

A head

Favorable outcome getting a head =1

No. of possible outcome =2

We know that

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{1}{2}$$

Question 3.

A coin is tossed twice. Find the probability of getting:

(i) Exactly one head

Solution:-

Exactly one head

Possible number of favorable outcomes =2 (i.e. TH and HT)

Total number of possible outcomes =4

We know that

$$\therefore P(E) = \frac{\text{Number of favourable outcomes}}{\text{Total number of possible outcomes}} = \frac{2}{4} = \frac{1}{2}$$

(ii) Exactly one tail

Solution:-

Exactly one tail

Possible number of favorable outcomes =2 (i.e. TH and HT)

Total number of possible outcomes =4

We know that

$$P(E) = \frac{\text{Number of favourable outcomes}}{\text{Total number of possible outcomes}} = \frac{2}{4} = \frac{1}{2}$$

(iii) Two tails

Solution:-

Possible number of favorable outcomes =1 (i.e. TT)

Total number of possible outcomes =4

We know that

$$P(E) = \frac{\text{Number of favourable outcomes}}{\text{Total number of possible outcomes}} = \frac{1}{4}$$

(iv) Two heads

Solution:-

Possible number of favorable outcomes =1 (i.e. HH)

Total number of possible outcomes = 4

So we get

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

Question 4.

A letter is chosen from the word 'PENCIL' what is the probability that the letter chosen is a consonant?

Solution:-

We know that

Total no. of letters in the word 'PENCIL' =6

Total Number of Consonant = 'PNCL' i.e, 4

Here

$$P(E) = \frac{\text{Total No. of consonants}}{\text{Total No. of Letters in the word PENCIL}} = \frac{4}{6} = \frac{2}{3}$$

Question 5.

A bag contains a black ball, a red ball and a green ball, all the balls are identical in shape and size. A ball is drawn from the bag without looking into it. What is the probability that the ball drawn is:

(i) a red ball

Solution:-

Total number of possible outcomes =3

$$P(E) = \frac{1}{3}$$

(ii) Not a red ball

Solution:-

No. of favorable outcomes

$$P(E) = \frac{2}{3}$$

(iii) A white ball.

Solution:-

No. of favorable outcomes =0

$$P(E) = \frac{0}{3} = 0$$

Question 6.

In a single throw of a die, find the probability of getting a number

(i) Greater than 2

Solution:-

A die has six numbers =1, 2, 3,4,5,6

No. of possible outcomes =6

$$P(E) = \frac{4}{6} = \frac{2}{3}$$

(ii) less than or equal to 2

Solution:-

Number of favorable outcomes =1, 2

$$P(E) = \frac{2}{6} = \frac{1}{3}$$

(iii) Not greater than 2.

Solution:-

Number of favorable outcomes =1, 2

$$P(E) = \frac{2}{6} = \frac{1}{3}$$

Question 7.

A bag contains 3 white, 5 black and 2 red balls, all of the same shape and size.

A ball is drawn from the bag without looking into it, find the probability that the ball drawn is:

(i) a black ball.

(ii) a red ball.

(iii) a white ball.

(iv) not a red ball.

(v) not a black ball.

Solution:-

In a bag, 3 balls are white

2 balls are red

5 balls are black

Total number of balls =3+2+5=10

(i) Number of possible outcomes of one black ball =10 and number of favorable outcome of one black ball = 5

We know that

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{5}{10} = \frac{1}{2}$$

(ii) Number of possible outcome of one red ball =10 and number of favorable outcome of one red ball =2

We know that

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{2}{10} = \frac{1}{5}$$

(iii) Number of possible outcome of one White ball =10 and number of favorable outcome =3

We know that

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{3}{10}$$

(iv) Number of possible outcome =10

Number of favorable outcome = 3+5=8

Not a red ball

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{8}{10} = \frac{4}{5}$$

(v) Number of possible outcome =10

Number of favorable outcome not a red ball=3+2=5

We know that

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{5}{10} = \frac{1}{2}$$

Question 8

In a single throw of a die, find the probability that the number:

- (i) Will be an even number.
- (ii) will be an odd number.
- (iii) will not be an even number.

Solution:-

A die has six numbers: 1, 2, 3, 4, 5, 6

Number of possible outcome =6

(i) Number of favorable outcome = an even number i.e. 2, 4, 6 which are 3 in numbers

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{3}{6} = \frac{1}{2}$$

(ii)&(iii) Number of favourable outcome = not an even number i.e. odd numbers

: 1,3,5 which are 3 in numbers

We know that

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{3}{6} = \frac{1}{2}$$

Question 9.

In a single throw of a die, find the probability of getting:

- (i) 8
- (ii) a number greater than 8
- (iii) a number less than 8

Solution:-

On a die the numbers are 1, 2, 3, 4, 5, 6 i.e, six.

Number of possible outcome =6

(i) Number of favorable outcome =0

(∵8 is not possible)

We know that

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{0}{6} = 0$$

(ii) Number greater than 8 will be 0

We know that

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{0}{6} = 0$$

(iii) Number less than 8 will be 1,2,3,4, 5, 6

We know that

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{6}{6} = 1$$

Question 10.

Which of the following cannot be the probability of an event?

- (i) $\frac{2}{7}$
- (ii) 3.8
- (iii) 37%
- (iv) -0.8
- (v) 0.8
- (vi) $\frac{-2}{5}$
- (vii) $\frac{7}{8}$

Solution:-

The probability of an event cannot be

(ii) 3.8 i.e., the probability of an even cannot exceed 1.

(iv) i.e., -0.8

(vi) $-2/5$, because probability of an even can never be less than 1.

Question 11.

A bag contains six identical black balls. A child withdraws one ball from the bag without looking into it. What is the probability that he takes out:

(i) a white ball,

(ii) a black ball

Solution:-

There are 6 black balls in a bag

Number of possible outcome =6

(i) A white ball

As there is no white ball in the bag

Probability is zero (0) = or $P(E)=0$

(ii) a black ball

Number of favorable outcome =1

We know that

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{1}{6}$$

Question 12.

Three identical coins are tossed together. What is the probability of obtaining?

(i) All heads?

(ii) Exactly two heads?

(iii) Exactly one head?

(iv) No head?

Solution:-

Total outcomes =8

i.e. (H,H,H),(H,H,T),(H,T,H),(T,T,T),(T,H,H),(T,T,H),(H,T,T),(T,H,T)

(i) Favorable outcome= i.e. (H,H,H)

$$P(\text{of getting all heads}) = \frac{1}{8}$$

(ii) Favorable outcomes = 3(H, H, T), (H, T, H), (T, H, H)

$$P(E) = \frac{3}{8}$$

(iii) Favorable outcomes = 3(H, T, H), (T, T, H), (H, T, T)

$$P(E) = \frac{3}{8}$$

(iv) Favorable outcomes = 1 i.e. (T, T, T)

$$P(E) = \frac{1}{8}$$

Question 13.

A book contains 92 pages. A page is chosen at random. What is the probability that the sum of the digits in the page number is 9?

Solution:-

Number of pages of the book = 92 which are from 1 to 92

Number of possible outcomes = 92

Here

Number of pages whose sum of its page is 9 = 10

i.e. 9, 18, 27, 36, 45, 54, 63, 72, 81, 90

$$P(E) = \frac{10}{92} = \frac{5}{46}$$

Question 14.

Two coins are tossed together. What is the probability of getting:

(i) at least one head

(ii) both heads or both tails.

Solution:-

A coin has two faces Head and Tail or H.T

Two coins are tossed

Here

Number of coins = $2 \times 2 = 4$ which are HH, HT, TH, TT

(i) At least one head, then Number of outcomes = 3

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{3}{4}$$

(ii) When both head or both tails, then

Number of outcomes =2

We know that

$$P(E) = \frac{\text{Number of favourable outcome}}{\text{Number of all possible outcome}} = \frac{2}{4} = \frac{1}{2}$$

Question 15.

From 10 identical cards, numbered 1, 2, 3, ..., 10, one card is drawn at random. Find the probability that the number on the card drawn is a multiple of:

(i) 2

(ii) 3

(iii) 2 and 3

(iv) 2 or 3

Solution:-

Total outcomes =10

i.e. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

(i) Favorable outcomes =5 i.e. 2, 4, 6, 8, 10

$$P(E) = \frac{5}{10} = \frac{1}{2}$$

(ii) Favorable outcomes =3 i.e. 3, 6, 9

$$P(E) = \frac{3}{10}$$

(iii) Favorable outcomes =1 i.e. 6

$$P(E) = \frac{1}{10}$$

(iv) Favorable outcomes =7

i.e. 2, 3, 4, 6, 8, 9, 10

$$P(E) = \frac{7}{10}$$