18. Probability

Exercise 18.1

1. Question

On tossing a dice once. What is the probability of getting a number greater than 4?

Answer

The outcomes on tossing a dice can be:

1,2,3,4,5,6.

No. of favorable outcomes = 2 (5,6)

No. of total outcomes = 6

As we know

Probability = $\frac{\text{No.of favourable outcomes}}{\text{No.of total outcomes}}$

⇒ Probability (Getting a number greater than 4)

$= \frac{2}{6}$

$\Rightarrow \frac{1}{3}$

2. Question

A coin is tossed twice. What is the probability of getting two heads?

Answer

The outcomes on tossing a coin twice are:

HH,HT,TH,TT

No. of favorable outcomes = 1

No. of total outcomes = 4

As we know

Probability = $\frac{\text{No.of favorable outcomes}}{\text{No.of total outcomes}}$

⇒ Probability (Getting two heads)

$= \frac{1}{4}$

3. Question

A number is chosen randomly from natural numbers 1 to 17. Find the probability that it is a prime number.

Answer

Total prime numbers between 1 to 17 are:

2,3,5,7,11,13,17

⇒ Total prime numbers = 7

Total Number between 1 to 17 is = 17

As we know,

Probability $= \frac{\text{No.of favorable outcomes}}{\text{No.of total outcomes}}$

⇒ Probability (chosen number is prime number)

$= \frac{7}{17}$

4. Question

A coin is tossed three times. Find the probability of getting all heads or all tails.

Answer

The outcomes on tossing a coin three times are:

HHH, HHT, HTH, HTT, THH, THT, TTH, TTT

No. of favorable outcomes = 2 (HHH,TTT)

No. of total outcomes = 8

As we know,

Probability $= \frac{\text{No.of favorable outcomes}}{\text{No.of totsl outcomes}}$

⇒ Probability (Getting all heads or all tails)

$= \frac{2}{8}$

$= \frac{1}{4}$

5. Question

Find the probability of getting only 52 Sundays in a non-leap year.

Answer

Numbers of days in non-leap year = 365

Numbers of weeks in non-leap year = $\frac{365}{7}$

= 52 weeks + 1 Day

As we have to find probability of only 52 Sundays.

And 52 weeks contain 52 Sundays.

⇒ The extra day should not be Sunday

⇒ Favorable outcomes = Monday, Tuesday, Wednesday, Thursday, Friday, Saturday

And no. of total outcomes = 7

As we know,

Probability = $\frac{\text{No.of favorable outcomes}}{\text{No.of total outcomes}}$

⇒ probability (Getting only 52 Sundays in a non-leap year)

= $\frac{6}{7}$

6. Question

If P(A) = 0.65 then what is the probability of "not A"?

Answer

As we know,

Probability ("not A") = 1 – Probability ("A")

⇒ Probability ("not A") = 1 – (.65)

⇒ Probability ("Not A") = .35

7. Question

Two unbiased coins are tossed simultaneously. Find the probability of getting at most one tail.

Answer

The outcomes When two unbiased coins are tossed simultaneously:

HH, HT, TH, TT

No. of favorable outcomes = 3

No. of total outcomes = 4

As we know,

Probability = $\frac{\text{No.of favorable outcomes}}{\text{No.of total outcomes}}$

⇒ Probability (Getting at most one tail)

$= \frac{3}{4}$

8. Question

A dice is tossed twice, what is the probability of getting the sum as (i) 9 (ii) 13.

Answer

The outcomes, When a dice is tossed twice are:

(1,1), (1,2), (1,3), (1,4), (1,5), (1,6)

(2,1), (2,2), (2,3), (2,4), (2,5), (2,6)

(3,1), (3,2), (3,3), (3,4), (3,5), (3,6)

(4,1), (4,2), (4,3), (4,4), (4,5), (4,6)

(5,1), (5,2), (5,3), (5,4) (5,5), (5,6)

(6,1), (6,2), (6,3), (6,4), (6,5), (6,6)

(i) Probability of getting the sum as 9

(6,3), (5,4), (4,5), (3,6)

The no. of favorable outcomes = 4

The no. of total outcomes = 36

As we know,

Probability = $\frac{\text{No.of favorable outcomes}}{\text{No.of total outcomes}}$

⇒ Probability (Getting the sum as 9)

$= \frac{4}{36}$

$\Rightarrow \frac{1}{9}$

(ii) Probability of sum getting as 13

The no. of favorable outcomes = 0

The no. of total outcomes = 36

As we know,

Probability = $\frac{\text{No.of favorable outcomes}}{\text{No.of total outcomes}}$

⇒ Probability (Getting the sum as 13)

= $\frac{0}{36}$

⇒ 0

9. Question

A bag contains 5 red and 3 white balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is

(i) a white ball?

(ii) not a white ball?

Answer

(i) The no. of white balls = 3

The no. of total balls in bag = 8

⇒ Probability (Getting a white ball)

= $\frac{\text{No.of favorable outcomes}}{\text{No.of total outcomes}}$

⇒ $\frac{3}{8}$

(ii) Not a white ball or red ball

⇒ The no. of red balls = 5

The no. of total balls in bag = 8

⇒ Probability (Getting not a white ball)

= $\frac{\text{No.of favorable outcomes}}{\text{No.of total outcomes}}$

= $\frac{5}{8}$

10. Question

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.

Answer

The no. of Good Pens = 132

The no. of total Pens = Defective Pens + Good Pens

⇒ The no. of total pens = 132 + 12

= 144

Probability (Pen taken out is Good one)

$$= \frac{\text{The no.of favorable outcome}}{\text{The no.of total outcome}}$$

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

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

11. Question

One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting.

(i) a jack of red colour.

(ii) a red card

(iii) an ace of hearts.

(iv) the Queen of diamonds.

(v) a spade

Answer

(i) The no. of jack of red colour = 2

The total no. of cards = 52

Probability (Getting a jack of red colour)

$$= \frac{\text{The no.of favorable outcomes}}{\text{The no.of total outcomes}}$$

$$\Rightarrow \frac{2}{52} = \frac{1}{26}$$

(ii) The no. of Red cards = 26

The no. of total cards = 52

Probability (Getting a red card)

$$= \frac{\text{The no.of favorable outcomes}}{\text{The no.of total outcomes}}$$

$$\Rightarrow \frac{26}{52} = \frac{1}{2}$$

(iii) The no. of ace of hearts = 1

The no. of total cards = 52

Probability (Getting an ace of hearts)

$$= \frac{\text{The no.favorable outcomes}}{\text{The no.of total outcomes}}$$

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

(iv)The no. of queen of diamonds = 1

The no. of total cards = 52

Probability (Getting the queen of diamonds)

$$= \frac{\text{The no.of favorable outcomes}}{\text{The no.of total outcomes}}$$

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

(v)The no of Spade cards = 13

The no. of total cards = 52

Probability (Getting a Spade) =

$$\frac{\text{The no. of favorable outcomes}}{\text{The no. of total outcomes}}$$

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