Chapter : 24. PROBABILITY

Exercise : 24A

Question: 1

A coin is tossed.

Solution:

(i) A coin has two sides a head(H) and a tail(T).

∴ There are X^m possible outcomes.

[Where X is number of outcomes when a coin is tossed and m is number of coins.]

That is $2^1 = 2$ and they are H, T.

∴ All possible outcomes are H, T.

(ii) A coin has two sides a head(H) and a tail(T), and there are two such coins.

∴ There are X^m possible outcomes.

[Where X is number of outcomes when a coin is tossed and m is number of coins.]

That is $2^2 = 4$ and they are HH, HT, TH, TT

∴ All possible outcomes are HH, HT, TH, TT.

(iii) A die has 6 faces and they are 1, 2, 3, 4, 5, 6

∴ All possible outcomes are 1, 2, 3, 4, 5, 6.

(iv) A deck of cards have a total of 52 cards.

∴ Number of possible outcomes are 52.

Question: 2

In a single throw

Solution:

A coin has two sides a head(H) and a tail(T).

∴ All possible outcomes are H, T.

Total number of outcomes = 2

Chances of getting a tail = 1

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a tail P(T) $\frac{\text{chances of getting a tail}}{\text{Total number of outcomes}} = \frac{1}{2}$

Question: 3

In a single throw

Solution:

(i) A coin has two sides a head(H) and a tail(T), and there are two such coins.

∴ There are X^m possible outcomes.

That is $2^2 = 4$ and they are HH, HT, TH, TT

∴ All possible outcomes are HH, HT, TH, TT.

Total number of outcomes = 4

Chances of getting 2 tails = 1, that is TT

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a tail P(both T) = $\frac{\text{Number of times two tails occured}}{\text{Total number of outcomes when a coin is tossed}} = \frac{1}{4}$

(ii) A coin has two sides a head(H) and a tail(T), and there are two such coins.

∴ There are X^m possible outcomes.

That is $2^2 = 4$ and they are HH, HT, TH, TT

∴ All possible outcomes are HH, HT, TH, TT.

Total number of outcomes = 4

Chances of getting atleast one tail = 3, that is HT, TH, TT.

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a tail P(atleast 1 T) = $\frac{\text{Number of times atleast 1 tail occured}}{\text{Total number of outcomes when a coin is tossed}} = \frac{3}{4}$

(iii) A coin has two sides a head(H) and a tail(T), and there are two such coins.

∴ There are X^m possible outcomes.

That is $2^2 = 4$ and they are HH, HT, TH, TT

∴ All possible outcomes are HH, HT, TH, TT.

Total number of outcomes = 4

Chances of getting atmost 1 tail = 3, that is HT, TH, TT.

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a tail P(atmost 1 T) = $\frac{\text{Number of times atmost 1 tail occured}}{\text{Total number of outcomes when a coin is tossed}} = \frac{3}{4}$

Question: 4

A bag contains 4

Solution:

(i) Total number of balls bag containing is: 4 white + 5 blue = 9 balls

Number of white balls = 4.

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a white ball P(W) = $\frac{\text{Number of white balls}}{\text{Total number of balls}} = \frac{4}{9}$

(ii) Total number of balls bag containing is: 4 white + 5 blue = 9 balls

Number of blue balls = 5.

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a blue ball P(B) = $\frac{\text{Number of blue balls}}{\text{Total number of balls}} = \frac{5}{9}$

Question: 5

A bag contains 5

Solution:

(i).

Total number of balls bag containing is: 5 white + 6 red + 4 green = 15 balls

Number of green balls = 4.

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a Green ball P(G) = $\frac{\text{Number of Green balls}}{\text{Total number of balls}} = \frac{4}{15}$

(ii).

Total number of balls bag containing is: 5 white + 6 red + 4 green = 15 balls

Number of white balls = 5.

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a white ball P(W) = $\frac{\text{Number of White balls}}{\text{Total number of balls}} = \frac{5}{15} = \frac{1}{3}$

(iii).

Total number of balls bag containing is: 5 white + 6 red + 4 green = 15 balls

Number of outcomes (No Red) = 5 + 4 = 9, that is 5 white balls + 4 Green balls.

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a Green ball P(G) = $\frac{\text{Number of blue balls+WHite balls}}{\text{Total number of balls}} = \frac{9}{15} = \frac{3}{5}$

Question: 6

In a lottery, the

Solution:

Total number of lottery Tickets = 30

Number of lottery tickets having a prize = 10

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a prized lottery ticket P(p) = $\frac{\text{Number of prized lottery tickets}}{\text{Total number of lottery tickets}} = \frac{10}{30} = \frac{1}{3}$

Question: 7

It is known that

Solution:

(i) Total number of electric bulbs = 100

Number of defective bulbs = 8

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a defective bulbs P(d bulbs) = $\frac{\text{Number of defective balls}}{\text{Total number of electric bubls}} = \frac{8}{100} = \frac{2}{25}$

(ii) Total number of electric bulbs = 100

Number of Non-defective bulbs = 100-8 = 92 (Number of electric bulbs – Number of defective bulbs)

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a Non- defective bulbs P(bulbs) = $\frac{\text{Number of non−defective balls}}{\text{Total number of electric bubls}} = \frac{92}{100} = \frac{23}{25}$

Question: 8

A die is thrown a

Solution:

(i) Total number of outcomes = 6 (they are 1,2,3,4,5,6)

Chances of getting 2 on the die = 1

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting 2 on die P(2) = $\frac{\text{possible chances of getting 2}}{\text{Total number of outcomes}} = \frac{1}{6}$

(ii) Total number of outcomes = 6 (they are 1,2,3,4,5,6)

Chances of getting a number less than 3 on the die = 2 (They are 1,2)

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a number less than 3 on die P(less than 3)

$= \frac{\text{possible chances of getting a number less than 3}}{\text{Total number of outcomes}} = \frac{2}{6} = \frac{1}{3}$

(iii) Total number of outcomes = 6 (they are 1,2,3,4,5,6)

Composite number: A number which is not a prime number or a number which is divisible by numbers other than 1 and the number itself.

Chances of getting a composite number on the die = 2 (They are 4,6)

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a composite number on die the P(composite number)

$= \frac{\text{possible chances of getting a number less than 3}}{\text{Total number of outcomes}} = \frac{2}{6} = \frac{1}{3}$

(iv) Total number of outcomes = 6 (they are 1,2,3,4,5,6)

Chances of getting a number not less than 4 on the die = 4 (They are 4,5,6)

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a number not less than 4 on die P(not less than 4)

$= \frac{\text{possible chances of getting a number less than 3}}{\text{Total number of outcomes}} = \frac{3}{6} = \frac{1}{2}$

Question: 9

In a survey of 20

Solution:

Total number of ladies: 200

Number of ladies who like coffee: 82

Number of ladies who dislike coffee: 118

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

Let p(No Coffee) be probability of ladies who dislike coffee

P (No Coffee) = $\frac{\text{Number of ladies who like coffee}}{\text{Total number ladies}}$

P (No Coffee) = $\frac{118}{200} = \frac{59}{100}$

Question: 10

A box contains 19

Solution:

(i) Total number of ball bearings = 19

Chances of drawing a prime numbered ball = 9 (They are 2,3,5,7,11,13,17,19)

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of drawing a prime numbered ball bearing P(prime ball)

$= \frac{\text{possible chances of drawing a prime numbered ball bearing}}{\text{Total number of ball bearings}} = \frac{8}{19}$

(ii) Total number of ball bearings = 19

Chances of drawing an even numbered ball = 9 (They are 2,4,6,8,10,12,14,16,18)

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of drawing an even numbered ball bearing P(even ball)

$= \frac{\text{possible chances of drawing an even numbered ball bearing}}{\text{Total number of ball bearings}} = \frac{9}{19}$

(iii) Total number of ball bearings = 19

Chances of drawing a numbered ball which is divisible by 3 =6 (They are 3,6,9,12,15,18)

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of drawing a numbered ball bearing which is divisible by 3 P(ball divisible by 3)

$= \frac{\text{possible chances of drawing a numbered ball bearing which is divisible by 3}}{\text{Total number of ball bearings}} = \frac{6}{19}$

Question: 11

One card is drawn

Solution:

(i) Total number cards in a deck = 52

Number of kings in a deck of cards = 4

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of drawing a king from the deck of cards P(king)

$= \frac{\text{Number of kings in a deck of cards}}{\text{Total number of cards in a deck}} = \frac{4}{52} = \frac{1}{13}$

(ii) Total number cards in a deck = 52

Number of spades in a deck of cards = 13

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of drawing a spade from the deck of cards P(spade)

$= \frac{\text{Number of spades in a deck of cards}}{\text{Total number of cards in a deck}} = \frac{13}{52} = \frac{1}{4}$

(iii) Total number cards in a deck = 52

Chances of drawing a Red queen from the deck of cards = 2 (they are queen of hearts and queen of diamonds)

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of drawing a Red queen from the deck of cards P(Red queen)

$= \frac{\text{chances of drawing a Red queen from the deck of cards}}{\text{Total number of cards in a deck}} = \frac{2}{52} = \frac{1}{26}$

(iv) Total number cards in a deck = 52

Chances of drawing a black 8 from the deck of cards = 2 (they are 8 of clubs and 8 of spades)

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of drawing a black 8 from a deck of cards P(black 8)

$= \frac{\text{chances of drawing a black 8 from the deck of cards}}{\text{Total number of cards in a deck}} = \frac{2}{52} = \frac{1}{26}$

Question: 12

(i) Total number cards in a deck = 52

Number of 4's in a deck of cards = 4

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of drawing a 4 numbered card from the deck of cards P(4)

$= \frac{\text{Number of 4's in a deck of cards}}{\text{Total number of cards in a deck}} = \frac{4}{52} = \frac{1}{13}$

(ii) Total number cards in a deck = 52

Number of Queens in a deck of cards = 4

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of drawing a queen from the deck of cards P(queen)

$= \frac{\text{Number of queen in a deck of cards}}{\text{Total number of cards in a deck}} = \frac{4}{52} = \frac{1}{13}$

(iii) Total number cards in a deck = 52

Number of black cards in a deck of cards = 26 (13 spades and 13 clubs)

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of drawing a black card from the deck of cards P(black)

$= \frac{\text{Number of black cards in a deck of cards}}{\text{Total number of cards in a deck}} = \frac{26}{52} = \frac{1}{2}$

Exercise : 24B

Question: 1

In a spinning whe

Solution:

Total number sectors = 8

Number of green sectors = 5

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

Probability of getting a green sector P(green) = $\frac{\text{Number of green sectors}}{\text{Total number of sectors}} = \frac{5}{8}$

Question: 2

8 cards are numbe

Solution:

Total number cards kept in the box = 8

Number of cards having a number less than 4 on it = 3

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of selecting a card with a number less than 4 P(No. less than 4)

$= \frac{\text{Number of cards having a number less than 4}}{\text{Total number of cards in a deck}} = \frac{3}{8}$

Question: 3

Two coins are tos

Solution:

All possible outcomes are HH, HT, TH, TT.

Total number of outcomes = 4

Chances of getting one head and one tail = 3, that is TH and HT

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a tail P(both T) = $\frac{\text{Number of one head and one tail occured}}{\text{Total number of outcomes when a coin is tossed}} = \frac{2}{4} = \frac{1}{2}$

Question: 4

A bag contains 3

Solution:

Total number of balls bag containing is: 3 white + 2 red = 5 balls

Number of red balls = 2

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting a red ball P(R) = $\frac{\text{Number of Red balls}}{\text{Total number of balls}} = \frac{2}{5}$

Question: 5

A die is thrown.

Solution:

Total number of outcomes = 6 (they are 1,2,3,4,5,6)

Chances of getting 6 on the die = 1

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting 6 on die P(6) = $\frac{\text{possible chances of getting 6}}{\text{Total number of outcomes}} = \frac{1}{6}$

Question: 6

A die is thrown.

Solution:

Total number of outcomes = 6 (they are 1,2,3,4,5,6)

Chances of getting a even number on the die = 3 they are (2,4,6)

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of getting even number on the die P(even) = $\frac{\text{chances of getting even number}}{\text{Total number of outcomes}} = \frac{1}{2}$

Question: 7

From a well-shuff

Solution:

Total number cards in a deck = 52

Number of Queens in a deck of cards = 4

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of drawing a queen from the deck of cards P(queen)

$= \frac{\text{Number of queen in a deck of cards}}{\text{Total number of cards in a deck}} = \frac{4}{52} = \frac{1}{13}$

Question: 8

From a well-shuff

Solution:

Total number cards in a deck = 52

Chances of drawing a black 6 from the deck of cards = 2 (they are 8 of clubs and 8 of spades)

Probability P() = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

∴ Probability of drawing a black 6 from a deck of cards P(black 6)

$= \frac{\text{chances of drawing a black 6 from the deck of cards}}{\text{Total number of cards in a deck}} = \frac{2}{52} = \frac{1}{26}$