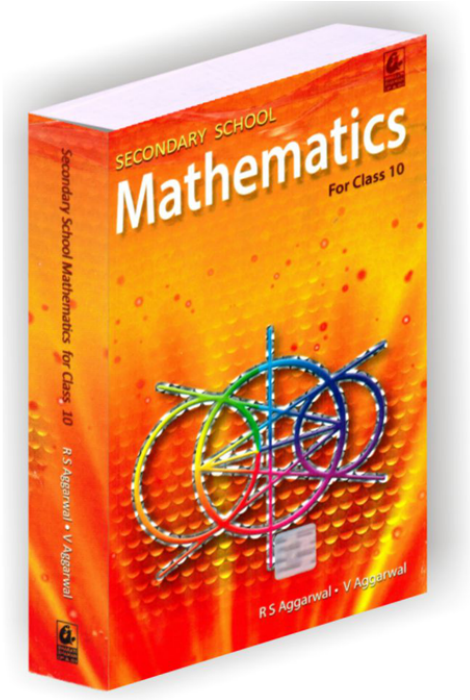
RS Aggarwal Solutions for Class 10 Maths Chapter 19–Probability

Class 10 - Chapter 19 Probability



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RS Aggarwal Solutions for Class 10 Maths Chapter 19–Probability

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Exercise 19

Question 1:

(i) The probability of an impossible event is 0

(ii) The probability of a sure event is 1

(iii) For any event E, P(E) + P(not E) = 1

(iv) The probability of a possible but not a sure event lies between 0 and 1

(v) The sum of probabilities of all the outcomes of an experiment is 1

Question 2:

When a coin is tossed, all possible outcomes are either H or T

Total number of possible outcomes = 2

The favorable outcome is T

Number of favorable outcomes = 1

∴ P(getting a T) = P(T)=Number of favorable outcomes Total number of possible out comes=12

Question 3:

In a throw of a dice, all possible outcomes are 1, 2, 3, 4, 5, 6

Total number of possible outcomes = 6

(i) Let E be event of getting even number

Then, the favorable outcomes are 2, 4, 6

Number of favorable outcomes = 3

P(getting a even number)= P(E) = 36=12

(ii) Let R be the number less than 5

Then, the favorable outcomes are 1, 2, 3, 4

Number of favorable outcomes = 4

P(getting a number less than 5)= P(R) = 46=23

(iii) Let M be the event of getting a number greater than 2

Then, the favorable outcomes are 3, 4, 5, 6

Number of favorable outcomes = 4

P(getting a number greater than 2)= P(M) = 46=23

(iv) Let N be the number lying between 3 and 6

Then the favorable outcomes are 4, 5

Number of favorable outcomes = 2

P(getting a number 3 and 6)= P(N) = 26=13

(v) Let G be event of getting a number other than 3

Then the favorable outcomes are 1, 2, 4, 5, 6

Number of favorable outcomes = 5

P(getting a number other than 5)=P(G) = 56

(vi) Let T be event of getting a number 5

Then the favorable outcome is 5

Number of favorable outcomes = 1

P(getting a number 5)=P(T) = 16

Question 4:

When two coins are tossed simultaneously all possible outcomes are HH, HT, TH, TT

Total number of possible outcomes = 4

(i) Let be event of getting exactly 1 heads

Then, favorable outcomes are HT, TH

Number of favorable outcomes = 2

P(getting exactly 1 head) = $P(E_1)$ = 24=12

(ii) Let be event of getting at most one head

So, the favorable outcomes are HT, TH, TT

Number of favorable outcomes = 3

P(getting at most 1 head) = $P(E_2)$ = 34

(iii) Let be the event of getting no tail

So, the favorable outcome is HH

Probability of getting no tail = $P(E_3)$ = 14

Question 5:

When 3 coins are tossed simultaneously all possible outcomes are HHH, HHT, HTH, THT, HTT, THH, TTT, TTH

Total number of possible outcomes = 8

Let E_1 be the event of getting at least 2 heads

Then, E_1= event of getting 2, 3 heads

So, the favorable outcomes are HHH, HHT, HTH, THH

Number of favorable outcomes = 4

P(getting of favorable outcomes = P(E_1) = 48=12

Question 6:

Total number of bulbs = 200

Number of defective bulbs = 16

(i) Let E_1 be the event of getting a defective bulb

Total number of defective bulbs = 16

P(getting defective bulbs) = P(E_1) = 16200=225

(ii) Let E_2 be the event of "getting non – defective bulb"

P(getting non defective bulb) = P(E_2) = 1−16200=184200=2325

Question 7:

Total number of tickets sold = 250

Number of prizes = 5

Let E be the event getting a prize

Number of favorable outcomes = 5

P(getting a prize) = P(E) = 5250=150

Question 8:

Total number of balls = (white + red + green) balls

= 5 + 6 + 4 = 15 balls

(i) Number of green balls = 4

P(getting a green ball) = 415

(ii) Number of white balls = 5

P(getting a white ball) = $515=13$

(iii) Number of non – red = 1 – P(getting red) = $1-615=915=35$

https://www.youtube.com/embed/a9gnSC1TDl0?feature=oembed

Question 9:

Total number of balls = 3 + 5 + 7 = 15

(i) Total number of white balls = 7

P(getting a white ball) = 715

(ii) Total number of Red balls = 3

P(getting a red ball) = $315=15$

(iii) P(getting no red ball) = 1 – P(getting a red ball) = $1-15=45$

(iv) Total number of red and white balls = 10

P(getting a red or white ball) = $1015=23$

Question 10:

Total number of balls = 7 + 5 + 3 = 15

(i) Total number of red balls = 5

P(getting a red ball) = $515=13$

(ii) Total number of black or white balls = 10

P(getting a black or white balls) = $1015=23$

(iii) P(getting not a black ball) = 1- P(getting a black ball) = $1-715=815$

Question 11:

Total number of balls = 7 + 5 + 3 = 15

(i) Total number of red and white balls = (7 + 5) = 12

P(getting a red or white balls) = $\frac{12}{15} = \frac{4}{5}$

(ii) Total number of black balls = 3

P(not black ball) = 1 – P(getting a black ball) = $1 - \frac{3}{15} = \frac{12}{15} = \frac{4}{5}$

(iii) Total number of white and black balls = 5 + 3 = 8

P(neither white nor black) = 1 – P(either white or black) = $[1 - (5+3)] = (1 - \frac{8}{15}) = \frac{7}{15}$

Question 12:

Total number of balls = 5 + 7 + 4 + 2 = 18

(i) Total number of blue and white balls = (5 + 2)

P(getting a white or blue ball) = $\frac{5+2}{18} = \frac{7}{18}$

(ii) Total number of red and black balls = (7 + 4)

P(getting a Red or black ball) = $\frac{7+4}{18} = \frac{11}{18}$

(iii) Total number of white balls = 5

P(not white ball) = 1 – P(white ball) = $1 - \frac{5}{18} = \frac{13}{18}$

(iv) Total number of white and black balls = (5 + 4)

P(neither white nor black ball) = 1 – P(either white or black ball) = $[1 - (5+4)] = (1 - \frac{9}{18}) = \frac{9}{18} = \frac{1}{2}$

Question 13:

A bag contains 5 red, 4 blue, 3 green balls

total number of balls = 12

(i) Number of red balls = 5

Probability of getting a red ball = $\frac{5}{12}$

(ii) Number of green balls = 3

The number of balls which are not green = 12 – 3 = 9

Probability of getting a ball which is not of green color = $\frac{9}{12}=\frac{3}{4}$

Question 14:

Let the number of red balls be x.

Then,

P(drawing a white ball) = $\frac{4}{4+x}$

P(drawing a red ball) = $\frac{x}{4+x}$

$\therefore \frac{x}{4+x}=2\left(\frac{4}{4+x}\right)$

$\Rightarrow x\,(4+x) = 8\,(4+x)$

$\therefore x = 8$

Hence, number of red balls is 8

Question 15:

Two dice are thrown simultaneously

Total number of outcomes = 6 × 6 = 36

(i) Favourable cases are: (1, 1), (1, 2), (1, 3), (1, 4), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), (2, 6), (3, 1), (3, 2), (3, 3), (3, 4), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 6) = 25.

Probability that 5 will not come upon either die = $\frac{25}{36}$

(ii) Favourable cases are: (1, 5), (2, 5), (3, 5), (4, 5), (5, 5), (6, 5), (5, 1), (5, 2), (5, 3), (5, 4), (5, 6) = 11

Probability that 5 will come at least once = $\frac{11}{36}$

(iii) 5 will come up on both dice in 1 case = (5,5)

probability that 5 will come on both dice = $\frac{1}{36}$

Question 16:

Total number of given numbers = 25

Prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23

Number of non – prime numbers = (25 – 9) = 16

P(getting a non-prime number) = 1625

Question 17:

Out of the given 30 numbers, those divisible by 3 are 3, 6, 9, 12, 15, 18, 21, 24, 27, 30

Total numbers are 10.

So the number of those cards which are not divisible by 3 is 20

P(getting a number not divisible by 3) = 2030=23

Question 18:

Total number of all possible outcomes = 25

(i) Even numbers are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

P(getting an even number) = 1225

(ii) Prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23

P(getting a prime number) = 925

(iii) Numbers that are multiples of 6 are 6, 12, 18, 24

P(getting a multiple of 6) = 425

Question 19:

Number of all possible outcomes = 19

(i) Prime numbers are 2, 3, 5, 7, 11, 13, 17, 19

P(getting a prime number) = 819

(ii) Numbers divisible by 3 or 5 are 3, 5, 6, 9, 10, 12, 15, 18

P(getting a number divisible by 3 or 5) = 819

(iii) Numbers divisible by 5 and 10 are 5, 10, 15

P(getting a number neither divisible by 5 nor 10) = $1-\frac{3}{19}=\frac{16}{19}$

(iv) Even numbers are 2, 4, 6, 8, 10, 12, 14, 16, 18

P(getting an even number) = $\frac{9}{19}$

Question 20:

Total number of balls = 20

(i) Odd numbers are 1, 3, 5, 7, 9, 11, 13, 15, 17, 19

P(getting an odd number) = $\frac{10}{20}=\frac{1}{2}$

(ii) Numbers divisible by 2 or 3 are

2, 3, 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20

P(getting a number divisible by 2 or 3) = $\frac{13}{20}$

(iii) Prime numbers are 2, 3, 5, 7, 11, 13, 17, 19

P(getting a prime number) = $\frac{8}{20}=\frac{2}{5}$

(iv) Numbers divisible by 10 are 10, 20

P(getting a number not divisible by 10) = $(1-\frac{2}{20})=\frac{18}{20}=\frac{9}{10}$

Question 21:

Total number of cards = 15

(i) Even numbers are 2, 4, 6, 8, 10, 12, 14

P(getting a even number) = $\frac{7}{15}$

(ii) Prime numbers are 2, 3, 5, 7, 11, 13

P(getting a prime number) = $\frac{6}{15}=\frac{2}{5}$

(iii) Numbers divisible by 3 are 3, 6, 9, 12, 15

P(getting a number divisible by 3) = $\frac{5}{15}=\frac{1}{3}$

(iv) Numbers divisible by 2 and 3 are 6, 12

P(getting a number divisible by 2 or 3) = 215

Question 22:

Total number of tickets = 100

(i) Even numbers are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100

Total number of even number = 50

P(getting a even number) = 50100=12

(ii) Numbers less than 16 are 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

Total number of numbers less than 16 is 14

P(getting a number less than 16) = 14100=750

(iii) Numbers which are perfect square are 4, 9, 16, 25, 36, 49, 64, 81, 100

Total number of perfect squares = 9

P(getting a perfect square) = 9100

(iv) Prime numbers less than 40 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37

Total number of prime numbers =12

P(getting a prime number less 40) = 12100=325

Question 23:

Cards are marked with numbers 13, 14, 15, , 60

the number of cards = 48

(i) The numbers on cards which are divisible by 5 are 15, 20, 25, 30, 35, 40, 45, 50, 55, 60

the number of favorable cases = 10

probability of getting a card with a number divisible by 5 = 1048=524

(ii) The numbers on cards which are perfect squares are 16, 25, 36, 49

the number of favorable outcomes = 4

probability of getting a card with number which is a perfect square = $\frac{4}{48}=\frac{1}{12}$

Question 24:

The cards are marked 5 to 50

the total number of cards = 46

(i) Prime numbers less than 10 are 5 and 7

There are two prime numbers

Probability of getting a prime number less than 10 = $\frac{2}{46}=\frac{1}{23}$

(ii) Perfect square numbers between 5 and 50 are 9, 16, 25, 36, 49

There are 5 cards having perfect square numbers

Probability of getting a card having a perfect square number = $\frac{5}{46}$

Question 25:

A leap year has 366 days i.e., 52 weeks and 2 days. These two days can be

(i) Sunday – Monday

(ii) Monday – Tuesday

(iii) Tuesday – Wednesday

(iv) Wednesday – Thursday

(v) Thursday – Friday

(vi) Friday – Saturday

(vii) Saturday – Sunday

Out of these 7 cases , 2 have Fridays

P(getting 53 Fridays) = $\frac{2}{7}$

Question 26:

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Probability of winning a game = 0.6

Probability of losing game = 1 – (probability of winning game)

= 1 – 0.6 = 0.4

Question 27:

Total number of all possible outcomes = 52

(i) P(getting an ace) = $\frac{4}{52}=\frac{1}{13}$

(ii) P(getting a '4' of spades) = $\frac{1}{52}$

(iii) P(a '9' of a black suit) = $\frac{2}{52}=\frac{1}{26}$

(iv) P(getting a red king) = $\frac{2}{52}=\frac{1}{26}$

Question 28:

Total numbers of cards = 52

(i) There are 4 queen cards in a pack of cards

Probability of getting a queen card = $\frac{4}{52}=\frac{1}{13}$

(ii) There are 13 cards of diamond in a pack of cards

probability of getting a diamond card = $\frac{13}{52}=\frac{1}{4}$

(iii) In a pack of cards there are 4 kings and 4 aces

Number of such cards = 4 + 4 = 8

Probability of getting either a king or an ace = $\frac{8}{52}=\frac{2}{13}$

(iv) There are two red aces in a pack of cards

probability of getting a red ace = $\frac{2}{52}=\frac{1}{26}$

Question 29:

There are 26 red cards containing a 2 queens and 2 more black queens are there in a pack of cards

P(getting a red card or a queen) = $\frac{28}{52} = \frac{7}{13}$

P(getting neither a red card nor a queen) = $(1 - \frac{7}{13}) = \frac{6}{13}$

Question 30:

Total number of cards = 52

There are 4 queens and 4 jacks in a pack of cards.

P(either a queen or a jack) = $\frac{8}{52} = \frac{2}{13}$

P(neither a queen nor a jack) = $(1 - \frac{2}{13}) = \frac{11}{13}$

Question 31:

Total number of cards = 52

(i) There are 13 cards of spade (including 1 ace) and 3 more ace cards are there in a pack of cards

P(getting a card of spades or an ace) = $\frac{16}{52} = \frac{4}{13}$

(ii) There are 2 red kings in a pack of cards

P(getting a red king) = $\frac{2}{52} = \frac{1}{26}$

(iii) There are 4 kings and 4 queens in a pack of cards

P(getting either a king or a queen) = $\frac{8}{52} = \frac{2}{13}$

(iv) P(getting neither a king nor a queen) = $(1 - \frac{2}{13}) = \frac{11}{13}$

Question 32:

Face cards in a pack of cards are Jacks, Queens and Kings

The number of face cards = 4 × 3 = 12

Total number of cards = 52

(i) Probability of getting a face card = $\frac{12}{52} = \frac{3}{13}$

(ii) Number of red cards = 26

Number of king cards which are not red = 2

probability of getting a red card or a black king card = $\frac{28}{52}=\frac{7}{13}$

Probability of getting neither a red card nor a king = $1-\frac{7}{13}=\frac{6}{13}$

Question 33:

Three cards King, Queen and Jack of club are removed

Remaining number of cards = 52 – 3 = 49

(i) Number of 'heart cards' = 13

P(heart card) = $\frac{13}{49}$

(ii) Number of queens = 4 – 1= 3

P(queen) = $\frac{3}{49}$

(iii) Number of 'club cards' = 13 – 3= 10

P(club cards) = $\frac{10}{49}$

Question 34:

4 cards: king, queen, jack and 10, all of spades are lost.

The remaining number of playing cards = 52 – 4 = 48

(i) The number of red cards = 26

Probability of getting a red card = $\frac{26}{48}=\frac{13}{24}$

(ii) Since 1 card, king of spade is lost, 3 kings are left in the pack of cards

Probability of getting a king = $\frac{3}{48}=\frac{1}{16}$

(iii) 4 black cards are lost. Remaining number of black cards = 26 – 4= 22

Probability of getting a black card = $\frac{22}{48}=\frac{11}{24}$

Question 35:

2 red Kings, 2 red Queens, 2 red Jacks are removed.

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Remaining number of cards = 52 – 6 = 46

(i) As 2 red kings are removed only 2 black cards are left

probability of getting a king card = $246=123$

(ii) 6 red cards are removed. Therefore, 20 red cards are left

probability of getting a red card = $2046=1023$

(iii) There are 13 cards of spade

probability of getting a spade card = 1346

Question 36:

Number of letters in the word ASSOCIATION are 11

(i) Vowels in the word ASSOCIATION are A, O, I, A, I, O

There are 6 vowels

Probability of getting a vowel = 611

(ii) Number of consonants = 11 – 6 = 5

Probability of getting a consonant = 511

Question 37:

Let the number of white balls be x

number of red balls = 27 – x

Probability of choosing a red ball = $27−x27$

Given that probability of getting a red ball is 23

$\Rightarrow 27−x27=23$

$\Rightarrow 27 – x = 18$

$\therefore x = 27 – 18 = 9$

number of white balls = 9

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Question 38:

Spinning arrow may come to rest at one of the 12 numbers

total number of outcomes = 12

(i) Probability that it will point at 6 = 112

(ii) Even numbers are 2, 4, 6, 8, 10 and 12. There are 6 numbers.

Probability that it points at even numbers = 612=12

(iii) The prime numbers are 2,3 5, 7 and 11. There are 5 prime numbers.

Probability that it points at prime number = 512

(iv) There are 2 numbers divisible by 5. These are 5 and 10.

Probability that a number is a multiple of 5 = 212=16

Question 39:

There are 18 cards having numbers 1, 3, 5, , 35 kept in a bag

(i) Prime numbers less than 15 are 3, 5, 7, 11, 13

There are 5 numbers.

Probability that card drawn bears a prime number less than 15 = 518

(ii) There is 1 number 15, which is divisible by both 3 and 5

Probability of drawing a card bearing a number divisible by both 3 and 5 = 118

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He was born on January 2, 1946 in a village of Delhi. He graduated from Kirori Mal College, University of Delhi. After completing his M.Sc. in Mathematics in 1969, he joined N.A.S. College, Meerut, as a lecturer. In 1976, he was awarded a fellowship for 3 years and joined the University of Delhi for his Ph.D. Thereafter, he was promoted as a reader in N.A.S. College, Meerut. In 1999, he joined M.M.H. College, Ghaziabad, as a reader and took voluntary retirement in 2003. He has authored more than 75 titles ranging from Nursery to M. Sc. He has also written books for competitive examinations right from the clerical grade to the I.A.S. level.

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