13. Probability

Exercise 13.1

1. Question

The probability that it will rain tomorrow is 0.85. What is the probability that it will not rain tomorrow?

Answer

P(happening) + P'(not happening) = 1

Given: P = 0.85

∴ P' = 1 – 0.85 = 0.15

2. Question

A die is thrown. Find the probability of getting:

(i) a prime number

(ii) 2 or 4

(iii) a multiple of 2 or 3

(iv) an even prime number

(v) a number greater than 5

(vi) a number lying between 2 and 6

Answer

Sample space, S = 6

(i) Number of event of getting a prime number, n(E) = 3

$$\therefore \ \mathrm{P} = \frac{n(E)}{n(S)} = \frac{3}{6} = \frac{1}{2}$$

(ii) $\mathrm{P} = \frac{n(E)}{n(S)} = \frac{2}{6} = \frac{1}{3}$

(iii) $\mathrm{P} = \frac{n(E)}{n(S)} = \frac{4}{6} = \frac{2}{3}$

(iv) $\mathrm{P} = \frac{n(E)}{n(S)} = \frac{1}{6}$

(v) $\mathrm{P} = \frac{n(E)}{n(S)} = \frac{1}{6}$

(vi) $\mathrm{P} = \frac{n(E)}{n(S)} = \frac{3}{6} = \frac{1}{2}$

3. Question

In a simultaneous throw of a pair of dice, find the probability of getting:

(i) 8 as the sum

(ii) a doublet

(iii) a doublet of prime numbers

(iv) a doublet of odd numbers

(v) a sum greater than 9

(vi) an even number on first

(vii) an even number on one and a multiple of 3 on the other

(viii) neither 9 nor 11 as the sum of the numbers on the faces

(ix) a sum less than 6

(x) a sum less than 7

(xi) a sum more than 7

(xii) at least once

(xiii) a number other than 5 n any dice.

(xiv) even number on each die

(xv) 5 as the sum

(xvi) 2 will come up at least once

(xvii) 2 will not come either time

Answer

Sample space = 36

(i) n(E) = 5

$$\therefore \mathrm{P} = \frac{n(E)}{n(S)} = \frac{5}{36}$$

(ii) n(E) = 6

$$\therefore \mathrm{P} = \frac{n(E)}{n(S)} = \frac{6}{36} = \frac{1}{6}$$

(iii) n(E) = 3

$$\therefore \mathrm{P} = \frac{n(E)}{n(S)} = \frac{3}{36} = \frac{1}{12}$$

(iv) $P = \frac{n(E)}{n(S)} = \frac{3}{36} = \frac{1}{12}$

(v) $P = \frac{n(E)}{n(S)} = \frac{6}{36} = \frac{1}{6}$

(vi) $P = \frac{n(E)}{n(S)} = \frac{3}{36} = \frac{1}{12}$

(vii) $P = \frac{n(E)}{n(S)} = \frac{11}{36}$

(viii) Number of event with sum 9 or 11 = 6

∴ Number of events of not getting a sum of either 9 or 11 = 36 – 6 = 30

$$P = \frac{n(E)}{n(S)} = \frac{30}{36} = \frac{5}{6}$$

(ix) $P = \frac{n(E)}{n(S)} = \frac{10}{36} = \frac{5}{18}$

(x) $P = \frac{n(E)}{n(S)} = \frac{15}{36} = \frac{5}{12}$

(xi) $P = \frac{n(E)}{n(S)} = \frac{15}{36} = \frac{5}{12}$

(xii) $P = \frac{n(E)}{n(S)} = \frac{11}{36}$

(xiii) $P = \frac{n(E)}{n(S)} = \frac{25}{36}$

4. Question

Three coins are tossed together. Find the probability of getting:

(i) exactly two heads

(ii) at most two heads

(iii) at least one head and one tail.

(iv) no tails

Answer

Sample space, n(S) = 8

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

(ii) $P = \frac{n(E)}{n(S)} = \frac{4}{8} = \frac{1}{2}$

(iii) $P = \frac{n(E)}{n(S)} = \frac{6}{8} = \frac{3}{4}$

(iv) $\mathrm{P} = \frac{n(E)}{n(S)} = \frac{1}{8}$

5. Question

What is the probability that an ordinary year has 53 Sundays?

Answer

Ordinary year has 365 days (52 weeks + 1 day)

That 1 day may be any day of the 7 days of a week

Therefore, total number of possible outcomes, n(S) = 7

And event of getting 53 Sunday is that 1 day is Sunday. Thus, n(E) = 1

$$\therefore \mathrm{P} = \frac{n(E)}{n(S)} = \frac{1}{7}$$

6. Question

What is the probability that a leap year has 53 Tuesdays and 53 Mondays?

Answer

A leap year has 366 days (52 weeks + 2 days)

That two days may be (sun, mon) (mon, tue) (tue, wed) (wed, thurs) (thurs, fri) (fri, sat) (sat, sun)

∴ n(S) = 7

Number of events for the occurrence of 53 Tuesdays and 53 Mondays, n(E) = 1

$$\therefore \mathrm{P} = \frac{n(E)}{n(S)} = \frac{1}{7}$$

7. Question

A and B throw a pair of dice. If A throws 9, find B's chance of throwing a higher number.

Answer

Given: A and B throw a pair of dice. A throws 9.

To find: B's chance of throwing a higher number.

Solution: Sample space of throwing a pair of dice is:

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

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

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

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

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

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

Sample space, n(S) = 36let E be the number of events of getting sum higher than 9 i.e getting 10,11 and 12.

The pairs are: $(4,6),(5,5),(5,6),(6,4),(6,5),(6,6)$

then n(E) = 6

We know:

$$Probability\ of\ an\ event = \frac{Number\ of\ favourable\ outcomes}{Total\ number\ of\ outcomes}$$

So,

$\mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{6}{36} = \frac{1}{6}$

8. Question

Two unbiased dice are thrown. Find the probability that the total of the numbers on the dice is greater than 10.

Answer

Possible outcomes, n(S) = 36

Number of events of getting sum greater than 10, n(E) = 3

$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{3}{36} = \frac{1}{12}$

9. Question

A card is drawn at random from a pack of 52 cards. Find the probability that the card drawn is

(i) a black king

(ii) either a black card or a king

(iii) black and a king

(iv) a jack, queen or a king

(v) neither a heart nor a king

(vi) spade or an ace

(vii) neither an ace nor a king

(viii) neither a red card nor a queen.

(ix) other than an ace

(x) a ten

(xi) a spade

(xii) a black card

(xiii) the seven of clubs

(xiv) jack

(xv) the ace of spades

(xvi) a queen

(xvii) a heart

(xviii) a red card

(xix) neither a king nor a queen

Answer

Total number of outcomes, n(S) = 52

(i) n(E) = 2

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{2}{52} = \frac{1}{26}$$

(ii) n(E) = 26 + 2 = 28

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{28}{52} = \frac{7}{13}$$

(iii) n(E) = 2

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{2}{52} = \frac{1}{26}$$

(iv) n(E) = 12

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{12}{52} = \frac{3}{13}$$

(v) n(E) = 36

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{36}{52} = \frac{9}{13}$$

(vi) n(E) = 16

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{16}{52} = \frac{4}{13}$$

(vii) n(E) = 44

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{44}{52}$$

(viii) n(E) = 24

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{24}{52} = \frac{6}{13}$$

(ix) n(E) = 48

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{48}{52} = 12/13$$

(x) n(E) = 4

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{4}{52} = \frac{1}{13}$$

(xi) n(E) = 13

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{13}{52} = \frac{1}{4}$$

(xii) n(E) = 26

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{26}{52} = \frac{1}{2}$$

(xiii) n(E) = 1

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{1}{52}$$

(xiv) n(E) = 4

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{4}{52} = \frac{1}{13}$$

(xv) n(E) = 1

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{1}{52}$$

(xvi) n(E) = 4

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{4}{52} = \frac{1}{13}$$

(xvii) n(E) = 13

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{13}{52} = \frac{1}{4}$$

(xviii) n(E) = 26

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{26}{52} = \frac{1}{2}$$

(xix) n(E) = 44

$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{44}{52} = \frac{11}{13}$

10. Question

In a lottery of 50 ticket bears a prime numbered 1 to 50, one ticket is drawn. Find the probability that the drawn ticket bears a prime number.

Answer

Total number of possible outcomes, n(S) = 50

Number of events of getting a prime number, N(E) = 15

Probability, $P(E) = \frac{n(E)}{n(S)} = \frac{15}{50} = \frac{3}{10}$

11. Question

An urn contains 10 red and 8 white balls. One ball is drawn at random. Find the probability that the ball drawn is white.

Answer

Total number of possible outcomes, n(S) = 10 + 8 = 18

Number of events of getting white ball, N(E) = 8

Probability, $P(E) = \frac{n(E)}{n(S)} = \frac{8}{18} = \frac{4}{9}$

12. Question

A bag contains 3 red balls, 5 black balls and 4 white balls. A balls is drawn at random from the bag. What is the probability that the ball drawn is:

(i) white?

(ii) red?

(iii) black?

(iv) not red?

Answer

Total number of possible outcomes, n(S) = 12 {3 red balls, 5 black balls and 4 white balls)

(i) n(E) = 4

$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{4}{12} = \frac{1}{3}$

(ii) n(E) = 3

$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{3}{12} = \frac{1}{4}$

(iii) n(E) = 5

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{5}{12}$$

(iv) n(E) = 9

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{9}{12} = \frac{3}{4}$$

13. Question

What is the probability that a number selected from the numbers 1, 2, 3,…, 15 is a multiple of 4?

Answer

Sample space, n(S) = 15

Number of events of getting numbers multiple of 4, n(E) = 3

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{3}{15} = \frac{1}{5}$$

14. Question

A bag contains 6 red, 8 black and 4 white balls. A ball is drawn at random. What is the probability that ball drawn is not black?

Answer

Sample space, n(S) = 18

Number of events of getting balls not black, n(E) = 10

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{10}{18} = \frac{5}{9}$$

15. Question

A bag contains 5 white and 7 red balls. One ball is drawn at random. What is the probability that ball drawn is white?

Answer

Sample space, n(S) = 12

Number of events of getting white ball, n(E) = 5

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{5}{12}$$

16. Question

Tickets numbered from 1 to 20 are mixed up and a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 7?

Answer

Sample space, n(S) = 20

Number of events of getting a multiples of 3 or 7 on the drawn ticket, n(E) = 8 {3,6,9,12,15,18,7,14}

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{8}{20} = \frac{2}{5}$$

17. Question

In a lottery there are 10 prizes and 25 blanks. What is the probability of getting a prize?

Answer

Sample space, n(S) = 35

Number of events of getting a prize, n(E) = 10

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{10}{35} = \frac{2}{7}$$

18. Question

If the probability of winning a game is 0.3, what is the probability of loosing it?

Answer

We not that, P(E) + P'(E) = 1

Here, P(E) = 0.3

P'(E) = 1 – 0.3 = 0.7

19. Question

A bag contains 5 black, 7 red and 3 white balls. A ball is drawn from the bag at random. Find the probability that the ball drawn is:

(i) red

(ii) black or white

(iii) not black

Answer

Sample space, n(S) = 15

(i) n(E) = 7

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{7}{15}$$

(ii) n(E) = 10

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{8}{15}$$

(iii) n(E) = 5

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{5}{15} = \frac{1}{3}$$

20. Question

A bag contains 4 red, 5 black and 6 white balls. A ball is drawn from the bag at random. Find the probability that the ball drawn is:

(i) white

(i) red

(iii) not black

(iv) red or white

Answer

Here, n(S) = 15

(i) n(E) = 6

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{6}{15} = \frac{2}{5}$$

(ii) n(E) = 4

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{4}{15}$$

(iii) number of events of getting black balls, n(E) = 5

∴ probability of getting black balls, $P(E) = \frac{n(E)}{n(S)} = \frac{5}{15} = \frac{1}{3}$

Hence, probability of getting black balls = 1 – P(E) = $1 - \frac{1}{3} = \frac{2}{3}$

(iv) number of events of getting a red or white ball, n(E) = 10

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{10}{15} = \frac{2}{3}$$

21. Question

A black die and a white die are thrown at the same time. Write all the possible outcomes. What is the probability?

(i) that the sum of the two numbers that turn up is 8?

(ii) of obtaining a total of 6?

(iii) of obtaining a total of 10?

(iv) of obtaining the same number on both dice?

(v) of obtaining a total more than 9?

(vi) that the sum of the two numbers appearing on the top of the dice is 13?

(vii) that the sum of the numbers appearing on the top of the dice is less that or equal to 12?

(viii) that the product of numbers appearing on the top of the two dice is 2.

(ix) that the difference of the numbers appearing on the top of the two dice is 2.

Answer

Sample space, n(S) = 36

(i) N(E) = 5

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{5}{36}$$

(ii) n(E) = 5

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{5}{36}$$

(iii) n(E) = 3

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{3}{36} = \frac{1}{12}$$

(iv) n(E) = 6

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{6}{36} = \frac{1}{6}$$

(v) n(E) = 6

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{6}{36} = \frac{1}{6}$$

(vi) The maximum sum is 12. So, getting a sum of number appearing on the top of the two dice as 13 is an impossible event.

∴ Probability, P(E) = 0

(vii) n(E) = 36

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{36}{36} = 1$$

(viii) n(E) = 2

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{2}{36} = \frac{1}{18}$$

(ix) n(E) = 8

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{8}{36} = \frac{2}{9}$$

22. Question

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

(i) a king of red suit

(ii) a face card

(iii) a red face card

(iv) a queen of black suit

(v) a jack of hearts

(vi) a spade

Answer

Number of possible outcomes, n(S) = 52

(i) n(E) = 2

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{2}{52} = \frac{1}{26}$$

(ii) n(E) = 12

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{12}{52} = \frac{3}{13}$$

(iii) n(E) = 6

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{6}{52} = \frac{3}{26}$$

(iv) n(E) = 2

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{2}{52} = \frac{1}{26}$$

(v) n(E) = 6

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{1}{52}$$

(vi) n(E) = 13

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{13}{52} = \frac{1}{4}$$

23. Question

Five cards – ten, jack, queen, king and an ace of diamonds are shuffled face downwards. One card is picked at random.

(i) What is the probability that the card is a queen?

(ii) If a king is drawn first and put aside, what is the probability that the second card picked up is the (a) ace? (b) king?

Answer

Total number of possible outcomes, n(S) = 5

(i) Number of events of drawing a queen, n(E) = 1

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{1}{5}$$

(ii) If a king is drawn first and put aside, total number of remaining cards, n(S) = 4

a) Probability that second card is ace, $\mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{1}{4}$

b) Since there was only a single king and when it is put aside, then n(E) = 0

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = 0$$

24. Question

A bag contains 3 red balls and 5 black balls. A ball is drawn at random form the bag. What is the probability that the ball drawn is:

(i) red

(ii) black

Answer

Total number of possible outcomes, n(S) = 8

(i) Number of possible outcomes of drawing a red ball, n(E) = 3

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{3}{8}$$

(ii) Number of possible outcomes of drawing a black ball, n(E) = 5

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{5}{8}$$

25. Question

A bag contains cards which are numbered from 2 to 90. A card is drawn at random from the bag. Find the probability that it bears

(i) a two digit number

(ii) a number which is a perfect square

Answer

Total number of possible outcomes, n(S) = 89

(i) Number of favorable outcomes of getting a two digit number = 81

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{81}{89}$$

(ii) Number of favorable outcomes of getting a perfect square = 8

$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{8}{89}$

26. Question

A game of chance consists of spinning an arrow which is equally likely to come to rest pointing to one of the number 1, 2, 3,…, 12 as shown in Fig. 13.3. What is the probability that it will point to:

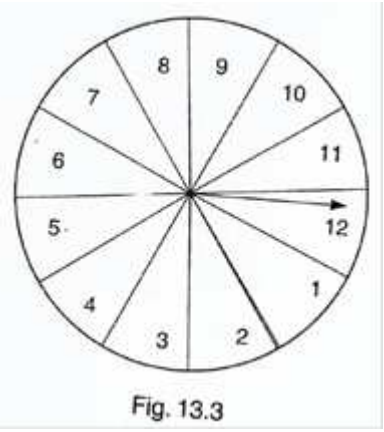

Fig. 13.3

(i) 10?

(ii) an odd number?

(iii) a number which is multiple of 3?

(iv) an even number?

Answer

The possible number of outcomes, n(S) = 12

(i) Number of favorable outcomes, n(E) = 1

$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{1}{12}$

(ii) Number of favorable outcomes, n(E) = 6

$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{6}{12} = \frac{1}{2}$

(iii) Number of favorable outcomes, n(E) = 4

$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{4}{12} = \frac{1}{3}$

(iv) Number of favorable outcomes, n(E) = 6

$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{6}{12} = \frac{1}{2}$

27. Question

Two customers are visiting a particular shop in the same wee (Monday to Saturday). Each is equally likely to visit the shop on any one day as on another. What is the probability that both will visit the shop on:

(i) the same day?

(ii) different days?

(iii) consecutive days?

Answer

Total number of days to visit the shop, n(S) = 36

(i) Number of favorable outcomes, n(E) = 6

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{6}{36} = \frac{1}{6}$$

(ii) n(E') = 1 – n(E) = $1 - \frac{1}{6} = \frac{5}{6}$

(iii) Number of favorable outcomes, n(E) = 5

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{5}{36}$$

28. Question

In a class, there are 18 girls and 16 boys. The class teacher wants to choose one pupil for class monitor. What she does, she writes the name of each pupil on a card and puts then into a basket and mixes thoroughly. A child is asked to pick one card from the basket. What is the probability that the name written on the card is:

(i) the name of a girl

(ii) the name of a boy

Answer

Total number of possible outcomes, n(S) = 34

(i) Number of favorable outcomes, n(E) = 18

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{18}{34} = \frac{9}{17}$$

(ii) Number of favorable outcomes, n(E) = 16

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{16}{34} = \frac{8}{17}$$

29. Question

Why is tossing a coin considered to be a fair way of deciding which team should choose ends in a game of cricket?

Answer

Number of possible outcomes, n(S) = 2

Probability of getting a head, P(E') = **?** = probability of getting a tail

Since both probabilities are equal for both of the events, therefore both of the players have equal chances to win the game and thus this is a fair way to make this decision that who will play first.

30. Question

What is the probability that a number selected at random from the number 1, 2, 2, 3, 3, 3, 4, 4, 4, 4 will be their average?

Answer

Total number of possible outcomes = 10

Average of the numbers = $\frac{sum\ of\ the\ given\ n\ numbers}{n} = \frac{30}{10} = 3$

∴ Number of favorable outcomes, n(E) = 3

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{3}{10}$$

31. Question

The faces of a red cube and a yellow cube are numbered from 1 to 6. Both cubes are rolled. What is the probability that the top face of each cube will have the same number?

Answer

Total number of possible outcomes, n(S) = 36

Number of favorable outcomes, n(E) = 6

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{6}{36} = \frac{1}{6}$$

32. Question

The probability of selecting a green marble at random form a jar that contains only green, white and yellow marbles is 1/4. The probability of selecting a white marble at random form the same jar is 1/3. If this jar contains 10 yellow marbles. What is the total number of marbles in the jar?

Answer

Let the number of green marbles be x and the number of white marbles be y

Total number of possible outcomes, n(S) = x + y + 10

$$\mathrm{P(E)} = \frac{n(E)}{n(S)}$$

Probability of green marbles = 1/4

$$\Rightarrow \frac{x}{x+y+10} = \frac{1}{4}$$

⇒ x + y + 10 = 4x

⇒ 3x – y – 10 = 0 ----------(i)

Probability of white marbles = $\frac{1}{3}$

$$\Rightarrow \frac{y}{x+y+10} = \frac{1}{3}$$

⇒ x – 2y + 10= 0 ----------(ii)

Solving eq. (i) and (ii), we get

x = 6 and y = 8

Thus, total number of marbles in the jar = x + y + 10 = 6 + 8 + 10 = 24

33. Question

There are 30 cards, of same size, in a bag on which numbers 1 to 30 are written. One card is taken out of the bag at random. Find the probability that the number on the selected card is not divisible by 3.

Answer

Total number of possible outcomes, n(S) = 30

Number of favorable outcomes of selecting a card divisible by 3, n(E) = 10

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{10}{30} = \frac{1}{3}$$

Number of favorable outcomes of not selecting a card divisible by 3 = 1 – P(E)

$$= 1 - \frac{1}{3} = \frac{2}{3}$$

34. Question

A bag contains 5 red, 8 white and 7 black balls. A ball is drawn at random from the bag. Find the probability that the drawn ball is (i) red or white (ii) not black (iii) neither white nor black.

Answer

Total number of possible outcomes, n(S) = 20

(i) Number of favorable outcomes, n(E) = 13

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{13}{20}$$

(ii) Number of events of getting a black ball, n(E) = 7

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{7}{20}$$

Probability of not getting a black ball = 1 – P(E)

$$= 1 - \frac{7}{20} = \frac{13}{20}$$

(iii) Number of favorable outcomes, n(E) = 5

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{5}{20} = \frac{1}{4}$$

35. Question

Find the probability that a number selected from the number 1 to 25 is not a prime number when each of the given numbers is equally likely to be selected.

Answer

Total number of possible outcomes, n(S) = 25

Number of events of getting a prime number, n(E) = 9

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{9}{25}$$

Number of events of not getting a prime number = 1 – P(E)

$$= 1 - \frac{9}{25} = \frac{16}{25}$$

36. Question

A bag contains 8 red, 6 white and 4 black balls. A ball is drawn at random from the bag. Find the probability that the drawn ball is

(i) red or white

(ii) not black

(iii) neither white or black

Answer

Total number of possible outcomes, n(S) = 18

(i) Number of favorable outcomes, n(E) = 14

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{14}{18} = \frac{7}{9}$$

(ii) Number of events of getting a black ball, n(E) = 4

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{4}{18} = \frac{2}{9}$$

Probability of not getting a black ball = 1 – P(E)

$$= 1 - \frac{2}{9} = \frac{7}{9}$$

(iii) Number of favorable outcomes, n(E) = 8

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{8}{18} = \frac{4}{9}$$

37. Question

Find the probability that a number selected at random from the numbers 1, 2, 3,…, 35 is a

(i) prime number

(ii) multiple of 7

(iii) a multiple of 3 or 5

Answer

Total number of possible outcomes, n(S) = 35

(i) Number of favorable outcomes, n(E) = 11

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{11}{35}$$

(ii) Number of favorable outcomes, n(E) = 5

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{5}{35} = \frac{1}{7}$$

(iii) Number of favorable outcomes, n(E) = 16

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{16}{35}$$

38. Question

From a pack of 52 playing cards Jacks, queens, kings and aces of red colour are removed. From the remaining, a card is drawn at random. Find the probability that the card drawn is

(i) a black queen

(ii) a red card

(iii) a black jack

(iv) a picture card (Jacks, queens and kings are picture cards).

Answer

Total number of possible outcomes, n(S) = 52 – 2 – 2 – 2 – 2 = 44

(i) Number of favorable outcomes, n(E) = 2

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{2}{44} = \frac{1}{22}$$

(ii) Number of favorable outcomes, n(E) = 26 – 8 = 18

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{18}{44} = \frac{9}{22}$$

(iii) Number of favorable outcomes, n(E) = 2

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{2}{44} = \frac{1}{22}$$

(iv) Number of favorable outcomes, n(E) = 6

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{6}{44} = \frac{3}{22}$$

39. Question

A bag contains lemon flavoured candies only. Malini takes out one candy without looking into the bag. What is the probability that she takes out.

(i) an orange flavoured candy?

(ii) a lemon flavoured candy?

Answer

(i) Since the bag contains lemon flavored candies only thus there is no chance of getting orange flavored candy.

∴ P(E) = 0

(ii) The bag contains lemon flavored candies only thus this is a sure event of getting lemon flavored candy

∴ P(E) = 1

40. Question

It is given that in a group of 3 students, the probability of 2 students not having the same birthday is 0.992. What is the probability that the 2 students have the same birthday?

Answer

Let E be the event of 2 students having the same birthday and _E' be the event of not getting the same birthday

Given: P(E) = 0.992

We know that, P(E) + P(E') = 1

∴ P(E') = 1 – P(E)

= 1 – 0.992

= 0.008

41. Question

A bag contains 3 red balls and 5 black balls is drawn at random from the bag. What is the probability that the ball drawn is (i) red? (ii) not red?

Answer

Total number of possible outcomes, n(S) = 8

(i) Number of favorable outcomes, n(E) = 3

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{3}{8}$$

(ii) Probability of not drawing a red ball = 1 – P(E)

$$= 1 - \frac{3}{8} = \frac{5}{8}$$

42. Question

A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) red (ii) white (iii) not green

Answer

Total number of possible outcomes, n(S) = 5 + 8 + 4 = 17

(i) Number of favorable outcomes, n(E) = 5

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{5}{17}$$

(ii) Number of favorable outcomes, n(E) = 8

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{8}{17}$$

(iii) Number of events of drawing a green marble = 4

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{4}{17}$$

Probability of not drawing green marble = 1 – P(E)

$$= 1 - \frac{4}{17} = \frac{13}{17}$$

43. Question

(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 not replaced. Now bulb is drawn at random from the box, find the probability that it bears (i) a two digit number (ii) a perfect square number (ii) a number divisible by 5.

Answer

(i) Total number of possible outcomes, n(S) = 20

Number of favorable outcomes, n(E) = 4

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{4}{20} = \frac{1}{5}$$

(ii) Total number of possible outcomes, n(S) = 19

Number of favorable outcomes, n(E) = 15

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{15}{19}$$

44. Question

A box contains 90 discs which are numbered from 1 to 90. If one discs 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.

Answer

Total number of possible outcomes, n(S) = 90

(i) Number of favorable outcomes, n(E) = 81

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{81}{90}$$

(ii) Number of favorable outcomes, n(E) = 9

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{9}{90} = \frac{1}{10}$$

(iii) Number of favorable outcomes, n(E) = 18

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{18}{90} = \frac{1}{5}$$

45. Question

A lot consists of 144 ball pens of which 20 are defective and others good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that

(i) She will buy it?

(ii) She will not buy it?

Answer

Total number of possible outcomes, n(S) = 144

(i) Number of favorable outcomes, n(E) = 124

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{124}{144} = \frac{31}{36}$$

(ii) Probability of not buying a defective pen = 1 – P(E)

$$= 1 - \frac{31}{36} = \frac{5}{36}$$

46. Question

12 defective pens are accidently mixed with 132 good ones. It is not possible to just look at pen and tell whether or not it is defective. One pen is taken out at random from this lit. Determine the probability that the pen taken out is good one.

Answer

Total number of possible outcomes, n(S) = 144

Number of favorable outcomes, n(E) = 132

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{132}{144} = \frac{11}{12}$$

47. Question

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 a side, what is the probability that the second card picked up is (a) an ace? (b) a queen?

Answer

Total number of possible outcomes, n(S) = 5

(i) Number of favorable outcomes, n(E) = 1

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{1}{5}$$

(ii) If queen is drawn and put aside, total number of remaining cards, n(S) = 4

a) Number of favorable outcomes, n(E) = 1

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

b) Total number of events of getting a queen = 0 as there is no queen

∴ P(E) = 0

48. Question

Harpreet tosses two different coins simultaneously (say, one is of Re 1 and other of Rs 2). What is the probability that he gets at least one head?

Answer

Total number of possible outcomes, n(S) = 4

Number of favorable outcomes, n(E) = 3

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{3}{4}$$

49. Question

Two dice, one blue and one grey, are thrown at the same time.

Complete the following table:

Events: Sum on two dice'	2	3	4	5	6	7	8	9	10	11	12
Probability											

From the above table a student argues that there are 11 possible outcomes 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12.

Therefore, each of them has a probability $\frac{1}{11}$. Do you agree with this argument?

Answer

Total number of possible outcomes, n(S) = 36

Number of favorable outcomes = n(E)

We know that, $\mathrm{P(E)} = \frac{n(E)}{n(S)}$

Sum of numbers on the two dice	2	3	4	5	6	7	8	9	10	11	12
n(E)	1	2	3	4	5	6	5	4	3	2	1
Probability	$\frac{1}{36}$	$\frac{2}{36}$	$\frac{3}{36}$	$\frac{4}{36}$	$\frac{5}{36}$	$\frac{6}{36}$	$\frac{5}{36}$	$\frac{4}{36}$	$\frac{3}{36}$	$\frac{2}{36}$	$\frac{1}{36}$

50. Question

Cards marked with numbers 13, 14, 15, …, 60 are placed in a box and mixed thoroughly. One card is drawn at random from the box. Find the probability that number on the card drawn is

(i) divisible by 5

(ii) a number is a perfect square

Answer

Total number of possible outcomes, n(S) = 48

(i) Number of favorable outcomes, n(E) = 10

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{10}{48} = \frac{5}{24}$$

(ii) Number of favorable outcomes, n(E) = 4

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{4}{48} = \frac{1}{12}$$

51. Question

A bag contains 6 red balls and some blue balls. If the probability of drawing a blue ball from the bag is twice that of a red ball, find the number of blue balls in the bag.

Answer

Given: number of red balls = 6

Let number of blue balls be x

Total number of possible outcomes, n(S) = 6 + x

Number of favorable outcomes = n(E)

$$\therefore P(E) = \frac{n(E)}{n(S)}$$

P(blue ball) = 2P(red ball)

$$\Rightarrow \frac{x}{x+6} = \frac{2\times6}{x+6}$$

$\Rightarrow$ x = 12

$\therefore$ number of blue balls = 12

52. Question

A bag contains tickets numbered 11, 12, 13, …, 30. A tickedt is taken out from the bag at random. Find the probability that the number on the drawn ticket (i) is a multiple of 7

(ii) is greater than 15 and a multiple of 5.

Answer

Total number of possible outcomes, n(S) = 20

(i) Number of favorable outcomes, n(E) = 3

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{3}{20}$$

(ii) Number of favorable outcomes, n(E) = 3

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{3}{20}$$

53. Question

The king, queen and jack of clubs are removed from a deck of 52 playing cards and the remaining cards are shuffled. A card is drawn from the remaining cards. Find the probability of getting a card of (i) heart (ii) queen

(iii) clubs.

Answer

Total number of possible outcomes, n(S) = 52 – 3 = 49

(i) Number of favorable outcomes, n(E) = 13

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{13}{49}$$

(ii) Number of favorable outcomes, n(E) = 4 – 1 = 3

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{3}{49}$$

(iii) Number of favorable outcomes, n(E) = 13 – 3 = 10

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{10}{49}$$

54. Question

Two dice are thrown simultaneously. What is the probability that:

(i) 5 will not come up on either of them?

(ii) 5 will come up on at least one?

(iii) 5 will come up at both dice?

Answer

Total number of possible outcomes, n(S) = 36

(i) Number of favorable outcomes, n(E) = 25

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{25}{36}$$

(ii) Number of favorable outcomes, n(E) = 11

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{11}{36}$$

(iii) Number of favorable outcomes, n(E) = 1

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{1}{36}$$

55. Question

Fill in the blanks:

(i) Probability of a sure event is …….. .

(ii) Probability of an impossible event is …….. .

(iii) The probability of an event (other than sure and impossible event) lies between …….. .

(iv) Every elementary event associated to a random experiment has ……. Probability.

(v) Probability of an event A+ Probability of event 'not A' = …….. .

(vi) Sum of the probabilities of each outcome in an experiment is …….. .

Answer

(i) 1

(ii) 0

(iii) 0 and 1

(iv) Equal

(v) 1

(vi) 1

56. Question

Examine each of the following statements and comment:

(i) If two coins are tossed at the same time, there are 3 possible outcomes – two heads, two tails, or one of each. Therefore, for each outcome, the probability of occurrence is 1/3.

(ii) If a die is thrown once, there are two possible outcomes – an odd number or an even number. Therefore, the probability of obtaining an odd number is and the probability of obtaining an even number is 1/2.

Answer

(i) Incorrect statement

If 2 coins are tossed at the same time = 4 possible outcomes (HH, HT, TH, TT}

Therefore probability of each outcome = 1/4

(ii) Correct statement

When a dice is thrown once, event of occurrence of 3 odd numbers and 3 even numbers are possible out of 6 outcomes. Therefore, P(even number) = P(odd number) = $\frac{3}{6} = \frac{1}{2}$

57. Question

A box contains 100 red cards, 200 yellow cards and 50 blue cards. If a card is drawn at random from the box, then find the probability that it will be (i) a blue card (ii) not a yellow card (iii) neither yellow nor a blue card

Answer

Total number of possible outcomes, n(S) = 100 + 200 + 50 = 350

(i) Number of favorable outcomes, n(E) = 50

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{50}{350} = \frac{1}{7}$$

(ii) Number of favorable outcomes, n(E) = 100 + 50 = 150

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{150}{350} = \frac{3}{7}$$

(iii) Number of favorable outcomes, n(E) = 100

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{100}{350} = \frac{2}{7}$$

58. Question

A number is selected at random from first 50 natural numbers. Find the probability that it is a multiple of 3 and 4.

Answer

Total number of possible outcomes, n(S) = 50

Number of favorable outcomes, n(E) = 4

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{4}{50} = \frac{2}{25}$$

59. Question

A box contains cards numbered 3, 5, 7, 9, …, 35, 37. A card is drawn at random from the box. Find the probability that the number on the drawn card is a prime number.

Answer

Total number of possible outcomes, n(S) = 18

Number of favorable outcomes, n(E) = 10

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{10}{18} = \frac{5}{9}$$

60. Question

A group consists of 12 persons, of which 3 are extremely patient, other 6 are extremely honest and rest are extremely kind. A person from the group is selected at random. Assuming that each person is equally likely to be selected, find the probability of selecting a person who is (i) extremely patient (ii) extremely kind or honest. Which of the above you prefer more.

Answer

Total number of possible outcomes, n(S) = 12

(i) Number of favorable outcomes, n(E) = 3

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{3}{12}$$

(ii) Number of favorable outcomes, n(E) = 9

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{9}{12} = \frac{3}{4}$$

61. Question

Cards numbered 1 to 30 are put in a bag. A card is drawn at random from this bag. Find the probability that the number on the drawn card is

(i) not divisible by 3

(ii) a prime number greater than 7

(iii) not a perfect square number.

Answer

Total number of possible outcomes, n(S) = 30

(i) Number of favorable outcomes of numbers divisible by 3, n(E) = 10

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{10}{30} = \frac{1}{3}$$

Probability of getting a number not divisible by 3 = 1 – P(E)

$$= 1 - \frac{1}{3} = \frac{2}{3}$$

(ii) Number of favorable outcomes, n(E) = 6

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{6}{30} = \frac{1}{5}$$

(iii) Number of favorable outcomes of getting a perfect square, n(E) = 5

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{5}{30} = \frac{1}{6}$$

Probability of not getting a perfect square = 1 – P(E)

$$= 1 - \frac{1}{6} = \frac{5}{6}$$

62. Question

A dice is rolled twice. Find the probability that

(i) 5 will not come up either time.

(ii) 5 will come up exactly one time

Answer

Total number of possible outcomes, n(S) = 36

(i) Number of favorable outcomes, n(E) = 11 {(5,1), (5,2), (5,3), (5,4), (5,5), (5,6), (1,5), (2,5), (3,5) (4,5), (6,5)}

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{11}{36}$$

(ii) Number of favorable outcomes, n(E) = 11 – 1 = 10

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{10}{36} = \frac{5}{18}$$

63. Question

A piggy bank contains hundred 50 paise coins, fifty ` 1 coins, twenty ` 2 coins and ten ` 5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, find the probability that the coin which fell

(i) will be a 50 paise win

(ii) will be of value more than ` 1

(iii) will be of value less than ` 5

(iv) will be a ` 1 or ` 2 coin

Answer

Total number of possible outcomes, n(S) = 100 + 50 + 20 + 10 = 180

(i) Number of favorable outcomes, n(E) = 100

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{100}{180} = \frac{5}{9}$$

(ii) Number of favorable outcomes, n(E) = 20 + 10 = 30

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{30}{180} = \frac{1}{6}$$

(iii) Number of favorable outcomes, n(E) = 100 + 50 + 20 = 170

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{170}{180} = \frac{17}{18}$$

(iv) Number of favorable outcomes, n(E) = 50 + 20 = 70

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{70}{180} = \frac{7}{18}$$

64. Question

All the black face cards are removed from a pack of 52 cards. The remaining cards are well shuffled and then a card is drawn at random. Find the probability of getting a

(i) face card (ii) red card

(iii) black card (iv) king.

Answer

Total number of possible outcomes, n(S) = 52 – 6 = 46

(i) Number of favorable outcomes, n(E) = 12 – 6 = 6

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{6}{26} = \frac{3}{23}$$

(ii) Number of favorable outcomes, n(E) = 26

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{26}{46} = \frac{13}{23}$$

(iii) Number of favorable outcomes, n(E) = 26 – 6 = 20

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{20}{46} = \frac{10}{23}$$

(iv) Number of favorable outcomes, n(E) = 4 – 2 = 2

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{2}{46} = \frac{1}{23}$$

65. Question

Cards numbered from 11 to 60 are kept in a box. If a card is drawn at random from the box, find the probability that the number on the drawn cards is

(i) an odd number

(ii) a perfect square number

(iii) divisible by 5

(iv) a prime number less than 20

Answer

Total number of possible outcomes, n(S) = 50

(i) Number of favorable outcomes, n(E) = 25

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{25}{50} = \frac{1}{2}$$

(ii) Number of favorable outcomes, n(E) = 4

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{4}{50} = \frac{2}{25}$$

(iii) Number of favorable outcomes, n(E) = 10

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{10}{50} = \frac{1}{5}$$

(iv) Number of favorable outcomes, n(E) = 4

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{4}{50} = \frac{2}{25}$$

66. Question

A bag contains cards numbered from 1 to 49. A card is drawn from the bag at random, after mixing the card thoroughly. Find the probability that the number on the drawn card is

(i) an odd number

(ii) a multiple of 5

(iii) a perfect square

(iv) an even prime number.

Answer

Total number of possible outcomes, n(S) = 49

(i) Number of favorable outcomes, n(E) = 25

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{25}{49}$$

(ii) Number of favorable outcomes, n(E) = 9

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{9}{49}$$

(iii) Number of favorable outcomes, n(E) = 6

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{7}{49} = \frac{1}{7}$$

(iv) Number of favorable outcomes, n(E) = 1

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{1}{49}$$

67. Question

All kings and queens are removed from a pack of 52 cards. The remaining cards are well – shuffled and then a card is randomly drawn from it. Find the probability that this card is (i) a red face card (ii) a black card.

Answer

Total number of possible outcomes, n(S) = 52 – 8 = 44

(i) Number of favorable outcomes, n(E) = 2

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{2}{44} = \frac{1}{22}$$

(ii) Number of favorable outcomes, n(E) = 26 – 4 = 22

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{22}{44} = \frac{1}{2}$$

68. Question

All jacks, queens and kings are removed from a pack of 52 playing cards. The remaining cards are well – shuffled and then a card is randomly drawn from it. Find the probability that this card is

(i) a black face card (ii) a red card

Answer

Total number of possible outcomes, n(S) = 52 – 12 = 40

(i) Since all jacks,

Number of favorable outcomes, n(E) =

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} =$$

69. Question

Red queens and black jacks are removed from a pack of 52 playing cards. A cards is drawn at random from the remaining cards, after reshuffling them. Find the probability that the card drawn is

(i) a king (ii) of red colour

(iii) a face card (iv) a queen

Answer

Total number of possible outcomes, n(S) = 52 – 2 – 2 = 48

(i) Number of favorable outcomes, n(E) = 4

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{4}{48} = \frac{1}{12}$$

(ii) Number of favorable outcomes, n(E) = 24

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{24}{48} = \frac{1}{2}$$

(iii) Number of favorable outcomes, n(E) = 12 – 4 = 8

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{8}{48} = \frac{1}{6}$$

(iv) Number of favorable outcomes, n(E) = 2

$$\therefore \mathrm{P(E)} = \frac{n(E)}{n(S)} = \frac{2}{48} = \frac{1}{24}$$

70. Question

A box contains 20 cards numbered from a 1 to 20. A card is drawn at random form the box. Find the probability that the number on the drawn card is

(i) divisible by 2 or 3

(ii) a prime number

Answer

Total number of possible outcomes, n(S) = 20

(i) Number of favorable outcomes, n(E) = 10 + 3 = 13 {(2, 4, 6, 8, 10, 12, 14, 16, 18, 20) (3, 9, 15)}

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{13}{20}$$

(ii) Number of favorable outcomes, n(E) = 8

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{8}{20} = \frac{2}{5}$$

71. Question

In a bag there are 44 identical cards with figure of circles, of which 9 are blue and rest are green and 20 squares of which 11 are blue and rest are green. One card is drawn from the bag at random. Find the probability that it has the figure of (i) square (ii) green colour (iii) blue circle and (iv) green square.

Answer

Total number of possible outcomes, n(S) = 44

(i) Number of favorable outcomes, n(E) = 20

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{20}{44} = \frac{5}{11}$$

(ii) Number of favorable outcomes, n(E) = (24 – 9) + (20 – 11) = 24

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{24}{44} = \frac{6}{11}$$

(iii) Number of favorable outcomes, n(E) = 9

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{9}{44}$$

(iv) Number of favorable outcomes, n(E) = 9

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{9}{44}$$

72. Question

All red face cards are removed from a pack of playing cards. The remaining cards are well shuffled and then a card is drawn at random from them. Find the probability that the drawn card is (i) a red card (ii) a face card and (iii) a card of clubs.

Answer

Total number of possible outcomes, n(S) = 52 – 6 = 46

(i) Number of favorable outcomes, n(E) = 26 – 6 = 20

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{20}{46} = \frac{10}{23}$$

(ii) Number of favorable outcomes, n(E) = 12 – 6 = 6

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{6}{46} = \frac{3}{23}$$

(iii) Number of favorable outcomes, n(E) = 13 – 3 = 10

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{10}{46} = \frac{5}{23}$$

CCE - Formative Assessment

1. Question

Cards each marked with one of the numbers 4, 5, 6, ..., 20 are placed in a box and mixed thoroughly. One card is drawn at random from the box. What is the probability of getting an even number?

Answer

The total number of elementary events are: 4,5,6 …..20 = 20 – 3= 17

Let E be the event of getting an even number on the random draw

Then total favorable outcomes are: 4, 6, 8, 10, 12, 14, 16, 18, 20

Total number of favorable outcomes = 9

P (even number) = P (E) = 9/17

2. Question

One card is drawn from a well shuffled deck of 52 playing cards. What is the probability of getting a non-face card?

Answer

Total numbers of elementary events are: 52

Let E be the event of getting a non –face card

The total number of favorable outcomes are ; 52 – 12 = 40: being four cards each of king , queen, jack being a face card , deleted from the favorable outcomes number

P (non-face card) = P (E) = 40/52 = 20/ 26 = 10/ 13

3. Question

A bag contains 5 red, 8 green and 7 white balls. One ball is drawn at random from the bag. What is the probability of getting a white ball or a green ball?

Answer

Total numbers of elementary events are: 5+8 + 7 = 20

Let E be the event of getting a green ball or a white ball

Total numbers of favorable outcomes are: 8+ 7 = 15

P (white or green ball) = P (E) = 15/20 = 3/4

4. Question

A die is thrown once. What is the probability of getting a prime number?

Answer

Total numbers of elementary events are: 6 being a dice having six faces

Let E be the event of getting a prime number

Total favorable outcomes are: 1, 2, 3, 5

Total number of favorable events = 4

P (prime number) = P (E) = 4/6 = 2/3

5. Question

A die is thrown once. What is the probability of getting a number lying between 2 and 6?

Answer

Total numbers of elementary events are: 6 being a dice having six faces

Let E be the event of getting a prime number

The favorable outcomes are: 3, 4, 5,

Total number of favorable outcomes are = 3

P (number between 2 and 6) = P (E) = 3/6 =1/2

6. Question

A die is thrown once. What is the probability of getting an odd number?

Answer

Total numbers of elementary events are: 6 being a dice having six faces

Let E be the event of getting a prime number

The favorable events are: 1, 3, 5

Number of favorable events = 3

P (odd number) = P (E) = 3/6 =1/2

7. Question

If E denote the complement or negation of an even E, what is the value of $P(E) + P(\bar{E})$?

Answer

E denotes the complement of an event E then $\overline{E}$ denotes the affirmation aspect and the probability of any event`s occurring or non-occurring , together is always 1

So P(E) + P($\overline{E}$) = 1

8. Question

One card is drawn at random from a well shuffled deck of 52 cards. What is the probability of getting an ace?

Answer

Total numbers of elementary events are 52

Let E be the event of getting an ace

The numbers of favorable events are: 4

P (an ace) = P (E) = 4/52 = 1/13

9. Question

Two coins are tossed simultaneously. What is the probability of getting at least one head?

Answer

Total numbers of elementary events are 2+ 2 = 4

Let E be the event of getting at least two heads

The favorable outcomes are: HH, HT, TH

Total numbers of favorable outcomes are 3

P (ATLEAST one head) = P (E) = 3/4

Note: at least one head means the outcome with one head or more will be considered favorable and the outcome with no head at all will be ruled out.

10. Question

Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn bears a number which is a multiple of 3?

Answer

Total numbers of elementary events are = 20

Let E be the event of drawing a multiple of 3

The favorable outcomes are: 3, 6, 9, 12, 15, 18

Total numbers of favorable outcomes are = 6

P (multiple of 3) = P (E) = 6/20 =3/10

11. Question

From a well shuffled pack of cards, a card is drawn at random. Find the probability of getting a black queen.

Answer

Total numbers of elementary events are 52

Let E be the event of drawing a black queen

Total numbers of favorable outcomes are 2

P (black queen) = P (E) = 2/52 = 1/26

12. Question

A die is thrown once. Find the probability of getting a number less than 3.

Answer

Total number of elementary events are : 6

Let E be the event of getting a number less than 3

Favorable events are: 1, 2

Total numbers of favorable events are =2

P (number less than 3) = P (E) = 2/6 =1/3

13. Question

Two coins are tossed simultaneously. Find the probability of getting exactly one head.

Answer

Total numbers of elementary events are 2+ 2 = 4

Let E be the event of getting one head

Favorable outcome are: TH , HT

Numbers of favorable outcomes are= 2

P (exactly one head) = P (E) = 2/4= 1/2

14. Question

A die is thrown once. What is the probability of getting a number greater than 4?

Answer

Total numbers of elementary events are 6

Let E be the event of getting number greater than 4

The favorable outcomes are: 5, 6

Number of favorable outcomes are = 2

P (number greater than 4) = P (E) = 2/6 = 1/3

15. Question

What is the probability that a number selected at random from the numbers 3, 4, 5, ..., 9 is a multiple of 4?

Answer

Total number of elementary events are = 7

Let E be the event of getting a multiple of 4

Favorable outcome are: 4, 8

Numbers of favorable outcome are= 2

P (multiple of 4) = P (E) = 2/7

16. Question

A letter of English alphabet is chosen at random. Determine the probability that the chosen letter is a consonant.

Answer

Total number of elementary events are= 26

Let E be the event of choosing a consonant

The favorable outcomes are: B, C, D, F, G, H, J, K, L, M, N, P, Q, R, S, T, V, W, X, Y, Z

Numbers of favorable outcomes are = 21

P (getting a consonant) = P (E) = 21/26

1. Question

If a digit is chosen at random from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9, then the probability that it is odd, is

A. $\frac{4}{9}$

B. $\frac{5}{9}$

C. $\frac{1}{9}$

D. $\frac{2}{3}$

Answer

Total numbers of elementary events are = 9

Let E be the event of getting an odd number

The favorable outcomes are: 1, 3, 5, 7, 9

Numbers of favorable events= 5

P (odd number) = P (E) = 5/9

2. Question

In Q. No. 1, the probability that the digit is even, is

A. $\frac{4}{9}$

B. $\frac{5}{9}$

C. $\frac{1}{9}$

D. $\frac{2}{3}$

Answer

Total numbers of elementary events are = 9

Let E be the event of getting an even number

Favorable outcomes are: 2, 4, 6, 8

Numbers of favorable outcomes are: 4

P (even number) = P (E) = 4/9

3. Question

In Q. No. 1, the probability that the digit is a multiple of 3 is

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $\frac{1}{9}$

D. $\frac{2}{9}$

Answer

Total numbers of elementary events are = 9

Let E be the event of getting a multiple of 3

Favorable outcomes are: 3, 6, 9

Numbers of favorable outcomes are: 3

P (multiple of 3) = P (E) = 3/9 = 1/3

4. Question

If three coins are tossed simultaneously, then the probability of getting at least two heads, is

A. $\frac{1}{4}$

B. $\frac{3}{8}$

C. $\frac{1}{2}$

D. $\frac{1}{4}$

Answer

Total numbers of elementary events are: 2 x 2 x 2 = 8

Let E be the event of getting at least two heads

Favorable outcomes are: THH, HHT, HHH, HTH

Numbers of favorable outcomes are: 4

P (at least two heads) = P (E) = 4/8 = 1/2

5. Question

In a single throw of a die, the probability of getting a multiple of 3 is

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{6}$

D. $\frac{2}{3}$

Answer

Total numbers of elementary events are: 6

Let E be the event of getting multiple of 3

Favorable events are: 3, 6

Numbers of favorable events are: 2

P (getting multiple of 3) = P (E) = 2/6 = 1/3

6. Question

A number x is chosen at random from the numbers -3, -2, -1, 0, 1, 2, 3 the probability that |x| < 2 is

A. $\frac{5}{7}$

B. $\frac{2}{7}$

C. $\frac{3}{7}$

D. $\frac{1}{7}$

Answer

Total numbers of elementary events are: 7

Let E be the event of getting $|x| < 2$

This means -2 < x < 2

Favorable outcomes are: -1, 0, 1

Numbers of favorable outcomes are: 3

We know,

$$P(E) = \frac{Number\ of\ favorable\ outcomes}{Total\ outcomes}$$

P ($|x| < 2$) = P (E) = 3/7

7. Question

The probability of guessing the correct answer to a certain test questions is x/12 . If the probability of not guessing the correct answer to this question is 2/3, then x =

A. 2

B. 3

C. 4

D. 6

Answer

Probability of guessing the correct answer is = P (E) = x/12

Probability of guessing the incorrect answer is = P (not E) = 2/3

P (E) + P (not E) = 1

x/12 + 2/3 = 1

x+8 = 12

x = 4

8. Question

A bag contains three green marbles, four blue marbles, and two orange marbles. If a marble is picked at random, then the probability that it is not an orange marble is

A. $\frac{1}{4}$

B. $\frac{1}{3}$

C. $\frac{4}{9}$

D. $\frac{7}{9}$

Answer

Total numbers of elementary events are: 3+ 4 + 2= 9

Let E be the event of getting not an orange marble

Numbers of Favorable outcomes are: 3 + 4 = 7

P (not an orange marble) = P (E) = 7/9

9. Question

A number is selected at random from the numbers 3, 5, 5, 7, 7, 7, 9, 9, 9, 9 The probability that the selected number is their average is

A. $\frac{1}{10}$

B. $\frac{3}{10}$

C. $\frac{7}{10}$

D. $\frac{9}{10}$

Answer

Total numbers of elementary events are: 10

Let E be the event of getting selected number being the average

Favorable outcome is = 70 /10 = 7

Average = total of observations/ numbers of observation

Total of observations = 3+ 5+ 5+ 7+ 7+ 7+ 9+ 9 + 9+ 9 = 70

Numbers of observation = 7

Numbers of favorable outcomes are: 3

P (selecting average number) = P (E) = 3/10

10. Question

If a number x is chosen from the numbers 1, 2, 3, and a number y is selected from the numbers 1, 4, 9. Then, P (xy < 9)

A. $\frac{7}{9}$

B. $\frac{5}{9}$

C. $\frac{2}{3}$

D. $\frac{1}{9}$

Answer

Total numbers of elementary events are: 3 x 3 = 9

Let E be the event of (xy < 9)

Favorable outcomes are: 1× 1 =1, 1×4 = 4, 2×1 =2, 2×4= 8, 3×1 =3

Numbers of favorable outcomes are: 5

P (xy < 9) = 5/9

11. Question

The probability of throwing a number greater than 2 with a fair dice is

A. $\frac{3}{5}$

B. $\frac{2}{5}$

C. $\frac{2}{3}$

D. $\frac{1}{3}$

Answer

Total numbers of elementary events are: 6

Let E be the event of getting a number greater than 2

Favorable outcomes are: 3, 4, 5, 6

Numbers of favorable outcomes are: 4

P (number>2) = P (E) = 4/6 =2/3

12. Question

A card is accidently dropped from a pack of 52 playing cards. The probability that it is an ace is

A. $\frac{1}{4}$

B. $\frac{1}{13}$

C. $\frac{1}{52}$

D. $\frac{12}{13}$

Answer

Total numbers of elementary events are: 52

Let E be the event of getting the dropped card as an ace

Favorable outcomes are: 4

P (ace) = P(E) = 4/52 = 1/13

13. Question

The probability that a non-leap year has 53 sundays, is

A. $\frac{2}{7}$

B. $\frac{5}{7}$

C. $\frac{6}{7}$

D. $\frac{1}{7}$

Answer

Total numbers of elementary events are: 7

Let E be the event of having 53 Sundays

Note- a non-leap year has 365 days or 52 weeks and 1 day. This one day could be any day amongst Sunday, Monday, Tuesday, Wednesday, Thursday, Friday or Saturday. Out of these favorable event is one; Sunday.

Number of favorable outcome is = 1

P (Sunday) = P (E) = 1/7

14. Question

A number is selected from numbers 1 to 25. The probability that it is prime is

A. $\frac{2}{3}$

B. $\frac{1}{6}$

C. $\frac{1}{3}$

D. $\frac{9}{25}$

Answer

Total numbers of elementary events are: 25

Let E be the event of getting a prime number

Favorable outcomes are: 2, 3, 5, 7, 11, 13, 17, 19, 23

Numbers of favorable outcomes are = 9

P (prime number) = P (E) = 9/25

15. Question

In a single throw of a pair of dice, the probability of getting the sum a perfect square is

A. $\frac{1}{18}$

B. $\frac{7}{36}$

C. $\frac{1}{6}$

D. $\frac{2}{9}$

Answer

Total numbers of elementary events are: 6 x 6 = 36

Let E be the event of getting a perfect square

Favorable outcomes are: 4, 9

4 and 9 can be rolled in combinations of: (2,2), (1,3), (3,1) , (3,6), (4,5), (5,4), (6,3)

Numbers of favorable outcomes are = 7

P (perfect square) = P (E) = 7/36

16. Question

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

A. $\frac{2}{3}$

B. -1.5

C. 15%

D. 0.7

Answer

Probability of an event cannot be negative or more than one so -1.5 can never be probability of any event.

17. Question

If P(E) = 0.05, then P(not E) =

A. - 0.05

B. 0.5

C. 0.9

D. 0.95

Answer

P (E) = 0.05 given

P (E) + P (not E) = 1

P (not E) = 1 – 0.05 = 0.95

18. Question

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

A. 0.2

B. 0.4

C. 0.8

D. 1.6

Answer

Probability of the occurrence of an event cannot be greater than 1.

1.6 Which is greater than 1 is the correct answer.

19. Question

The probability of a certain event is

A. 0

B. 1

C. 1/2

D. no existent

Answer

Probability of a certain event is always 1.

20. Question

The probability of an impossible event is

A. 0

B. 1

C. 1/2

D. non-existent

Answer

Probability of an impossible event is always zero (0)

21. Question

What is the probability that a non-leap year has 53 Sundays?

A. $\frac{6}{7}$

B. $\frac{1}{7}$

C. $\frac{5}{7}$

D. None of these

Answer

Total numbers of elementary events are: 7

Let E be the event of having 53 Sundays

Note- a non-leap year has 365 days or 52 weeks and 1 day. This one day could be any day amongst Sunday, Monday, Tuesday, Wednesday, Thursday, Friday or Saturday. Out of these favorable event is one; Sunday.

Number of favorable outcome is = 1

P (Sunday) = P (E) = 1/7

22. Question

Aarushi sold 100 lottery tickets in which 5 tickets carry prizes. If Priya purchased a ticket, what is the probability of Priya winning a prize?

A. $\frac{19}{20}$

B. $\frac{1}{25}$

C. $\frac{1}{20}$

D. $\frac{17}{20}$

Answer

Total numbers of elementary events are: 100

Let E be the event of winning a prize

Numbers of favorable outcomes are = 5

P (prize winning) = P (E) = 5/100 = 1/20

23. Question

A number is selected from first 50 natural numbers. What is the probability that it is a multiple of 3 or 5?

A. $\frac{13}{25}$

B. $\frac{21}{50}$

C. $\frac{12}{25}$

D. $\frac{23}{50}$

Answer

Total numbers of elementary event are: 50

Let E be the event of getting a multiple of 3 or 5

Favorable outcomes are: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 5, 10, 20, 25, 35, 40, 50

Numbers of favorable outcomes are: 23

P (multiple of 3 or 5) = P (E) = 23/50

24. Question

Two numbers 'a' and 'b' are selected successively without replacement in that order from the integers 1 to 10. The probability that a/b is an integer, is

A. $\frac{17}{45}$

B. $\frac{1}{5}$

C. $\frac{17}{90}$

D. $\frac{8}{45}$

Answer

Total numbers of elementary events are: 10 x 9= 90

Being numbers are of non-replacing nature and order matters

Let E be the event of a/b as an integer

Favorable events are:

2/1, 3/1 , 4/1, 4/2, 5/1 , 6/1, 6/2 , 6/3 , 7/1 , 8/4 , 8/2 , 8/1, 9/3 , 9/1 , 10/5 , 10/2 , 10/1

Numbers of favorable outcomes are: 17/90

P (a/b is an integer) = P (E) = 17/90

25. Question

Two dice are rolled simultaneously. The probability that they show different faces is

A. $\frac{2}{3}$

B. $\frac{1}{6}$

C. $\frac{1}{3}$

D. $\frac{5}{6}$

Answer

Total numbers of elementary events are: 6 x 6 = 36

Let E be the event of getting of showing different faces on both the dice

Numbers of favorable events on first dice are: 6

Numbers of favorable events on second dice are: 5

Total numbers of favorable events are = 6 × 5 = 30

P (each dice showing different face) = 30/36 = 10/12 = 5/6

26. Question

What is the probability that a leap year has 52 Mondays?

A. $\frac{2}{7}$

B. $\frac{4}{7}$

C. $\frac{5}{7}$

D. $\frac{6}{7}$

Answer

Total numbers of elementary events are: 7

Let E be the event of having exactly 52 Mondays

Note- a leap year has 366 days or 52 weeks and 2 day. Two days could be any days amongst Sunday, Monday, Tuesday, Wednesday, Thursday, Friday or Saturday.

Favorable outcomes are: Tuesday, Wednesday, Thursday, Friday, Saturday,

Number of favorable outcome is = 5

P (52 Mondays) = P (E) = 5/7

27. Question

A month is selected at random in a year. The probability that it is March or October, is

A. $\frac{1}{12}$

B. $\frac{1}{6}$

C. $\frac{3}{4}$

D. None of these

Answer

Total numbers of elementary events are: 12

Let E be the event of having month as March or October

Numbers of favorable events are = 2

P (March or October) = P(E) = 2/12 = 1/6

28. Question

From the letters of the word "MOBILE", a letter is selected. The probability that the letter is a vowel, is

A. $\frac{1}{3}$

B. $\frac{3}{7}$

C. $\frac{1}{6}$

D. $\frac{1}{2}$

Answer

Total numbers of elementary events are: 6

Let E be the event of selecting a vowel

Favorable outcomes are: O, I, E

Numbers of favorable events are = 3

P (vowel) = P (E) = 3/6 = 1/2

29. Question

If a two digit number is chosen at random, then the probability that the number chosen is a multiple of 3, is

A. $\frac{3}{10}$

B. $\frac{29}{100}$

C. $\frac{1}{3}$

D. $\frac{7}{25}$

Answer

Total numbers of elementary event are: 90

Let E be the event of choosing a multiple of 3

Favorable outcomes are: 3× 4 =12 , 3×5= 15, 3×6= 18, 3×7= 21,….. 3×33= 99

Numbers of favorable outcomes are= 30

P(multiple of 3) = P (E) = 30/90 = 1/3

30. Question

Two dice are thrown together. The probability of getting the same number on both dice is

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{6}$

D. $\frac{1}{12}$

Answer

Total numbers of elementary events are: 6x 6= 36

Let E be the event of getting same number on both dice together

Favorable outcomes are: (1,1), (2,2), (3,3), (4,4), (5,5), (6,6)

Numbers of favorable outcomes are: 6

P(both same numbers) = P (E) = 6/36 = 1/6

31. Question

A die is thrown once. The probebility of getting a prime number is

A. $\frac{2}{3}$

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. $\frac{1}{6}$

Answer

Total numbers of elementary events are: 6

Let E be the event of getting a prime number

Favorable events are: 2, 3, 5

Numbers of favorable events are= 3

P (prime number) = P (E) = 3/6 = 1/2

32. Question

The probability of getting an even number, when a die is thrown once is

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{6}$

D. $\frac{5}{6}$

Answer

Total numbers of elementary events are: 6

Let E be the event of getting an even number

Favorable events are : 2, 4, 6

Numbers of favorable events are: 3

P (even number on dice) = P (E) = 3/6 = 1/2

33. Question

A box contains 90 discs, numbered from 1 to 90. If one disc is drawn at random from the box, the probability that it bears a prime number less than 23, is

A. $\frac{7}{90}$

B. $\frac{10}{90}$

C. $\frac{4}{45}$

D. $\frac{9}{89}$

Answer

Total numbers of elementary events are: 90

Let E be the event of drawing prime number less than 23

Favorable outcomes are: 2, 3, 5, 7, 11, 13, 17, 19

Numbers of favorable outcomes are: 8

P (prime number less than 23) = P (E) = 8/90 = 4/45

34. Question

The probability that a number selected at random from the numbers 1, 2, 3,...,15 is a multiple of 4, is

A. $\frac{4}{15}$

B. $\frac{2}{15}$

C. $\frac{1}{5}$

D. $\frac{1}{3}$

Answer

Total numbers of elementary events are: 15

Let E be the event of getting a multiple of 4

Favorable outcomes are: 4, 8, 12

Numbers of favorable outcomes are = 3

P (multiple of 4) = P (E) = 3/15 = 1/5

35. Question

In a family of 3 children, the probability of having at least one boy is

A. $\frac{7}{8}$

B. $\frac{1}{8}$

C. $\frac{5}{8}$

D. $\frac{3}{4}$

Answer

Total numbers of elementary events are: 2×2×2 = 8

(Each child could be either a girl or a boy)

Let E be the event of having at least one boy

(Note- at least one boy means there could be one or two or three boys in the family. The possibility of all the three girls is not considerable.)

P (having all girls) = P (not E) = 1/8

P (HAVING at least one boy) = 1- P (not E) = 1- 1/8 = 7/8

36. Question

A bag contains cards numbered from 1 to 25. A card is drawn at random from the bag. The probability that the number on this card is divisible by both 2 and 3 is

A. $\frac{1}{5}$

B. $\frac{3}{25}$

C. $\frac{4}{25}$

D. $\frac{2}{25}$

Answer

Total numbers of elementary events are: 25

Let E be the event of getting number divisible by both 2 and 3

Favorable outcomes are: { 6, 12, 18, 24}

Numbers of favorable outcomes are: 4

P (number divisible by 2 and 3) = P (E) = 4/25

37. Question

Two different coins are tossed simultaneously. The probability of getting at least one head is

A. $\frac{1}{4}$

B. $\frac{1}{8}$

C. $\frac{3}{4}$

D. $\frac{7}{8}$

Answer

Total numbers of elementary events are 2×2 =4

Let E be the event of at least one head

Favorable events are: having one head or both the heads. The possibility with all tails is not considerable.

P (both tails) = 1/4

P (having at least one head) = P (E) = 1 – P (both tails) = 1 – 1/4 = 3/4

38. Question

If two different dice are rolled together, the probability of getting an even number on both dice, is

A. $\frac{1}{36}$

B. $\frac{1}{2}$

C. $\frac{1}{6}$

D. $\frac{1}{4}$

Answer

Total numbers of elementary events are: 6 x 6 = 36

Let E be the event of getting an even number on both the dice

Favorable outcomes are: (2,2) , (2,4), (2,6), (4,2), (4,4), (4,6), (6,2), (6,4), (6,6)

Numbers of favorable outcomes are = 9

P (getting even number on both dice) = P (E) = 9/36 = 1/4

39. Question

A number is selected at random from the numbers 1 to 30. The probability that it is a prime number is

A. $\frac{2}{3}$

B. $\frac{1}{6}$

C. $\frac{1}{3}$

D. $\frac{11}{30}$

Answer

Total numbers of elementary events are: 30

Let E be the event of selecting a prime number

Favorable outcomes are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

Numbers of favorable outcomes are: 10

P (prime number) = P (E) = 10/30 = 1/3

40. Question

A card is drawn at random from a pack of 52 cards. The probability that the drawn card is not an ace is

A. $\frac{1}{13}$

B. $\frac{9}{13}$

C. $\frac{4}{13}$

D. $\frac{12}{13}$

Answer

Total numbers of elementary events are: 52

Let E be the event of drawing card other than ace

Favorable numbers of events are: 52 – 4= 48

P (not drawing ace) = P (E) = 48/52 = 24/26 = 12/13