12. Probability

Exercise 12.1

1. Question

A ticket is drawn from a bag containing 100 tickets. The tickets are numbered from one to hundred. What is the probability of getting a ticket with a number divisible by 10?

Answer

From 1 to 100 the numbers divisible by 10 are: 10,20 30 40 50 60 70 80 90 100.

Thus probability of getting a number divisible by 10 $= \frac{\text{probable outcomes}}{\text{total outcomes}}$

$= \frac{10}{100}$

$= \frac{1}{10}$

2. Question

A die is thrown twice. Find the probability of getting a total of 9.

Answer

The outcomes on throwing a dice twice are: (1,1),(1,2),(1,3),(1,4),(1,5),(1,6)

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

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

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

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

(61),(6,2),(63),(6,4),(6,6),(6,6)

Thus the total probable outcomes = 4

⇒ probability $= \frac{4}{36}$

$= \frac{1}{9}$

3. Question

Two dice are thrown together. Find the probability that the two digit number formed with the two numbers turning up is divisible by 3.

Answer

The outcomes on throwing a dice twice are: (1,1),(1,2),(1,3),(1,4),(1,5),(1,6)

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

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

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

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

(61),(6,2),(63),(6,4),(6,6),(6,6)

Thus the total probable outcomes = 12

⇒ probability $= \frac{12}{36}$

$= \frac{1}{3}$

4. Question

Three rotten eggs are mixed with 12 good ones. One egg is chosen at random. What is the probability of choosing a rotten egg?

Answer

The total number of eggs according to question = 12+3

= 15

No of rotten eggs = 3

⇒ probability $= \frac{3}{15}$

$= \frac{1}{5}$

5. Question

Two coins are tossed together. What is the probability of getting at most one head.

Answer

The outcomes when two coins are tossed are (H,H),(T,T),(H,T)(T,H)

H = head, T = tail

No of probable outcomes of at most one head = 3

⇒ probability $= \frac{3}{4}$

6. Question

One card is drawn randomly from a well shuffled deck of 52 playing cards. Find the probability that the drawn card is

(i) a Diamond (ii) not a Diamond (iii) not an Ace.

Answer

In a deck of 52 cards,13 = diamonds

13 = spade

13 = hearts

13 = club

And there are 4 aces.

(i) ⇒ probability $= \frac{13}{52}$

$= \frac{1}{4}$

(ii) ⇒ probability $= 1 - \frac{13}{52}$

$= \frac{3}{4}$

(iii) ⇒ probability $= 1 - \frac{4}{52}$

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

$= \frac{12}{13}$

7. Question

Three coins are tossed simultaneously. Find the probability of getting

(i) at least one head (ii) exactly two tails (iii) at least two heads.

Answer

The outcomes when three coins are tossed aare:(H H H) (H H T) (H T H) (T H H) (T T H) (T H T) (H T T) (T T T)

(i) No of probable outcomes of getting at least one head = 7

⇒ probability $= \frac{7}{8}$

(ii) no of probable outcomes of getting exactly 2 tails = 3

⇒ probability $= \frac{3}{8}$

(iii) no of probable outcomes pf at least two heads = 4

⇒ probability $= \frac{4}{8}$

$= \frac{1}{2}$

8. Question

A bag contains 6 white balls numbered from 1 to 6 and 4 red balls numbered from 7 to 10. A ball is drawn at random. Find the probability of getting

(i) an even-numbered ball (ii) a white ball.

Answer

Total no of white balls = 6

Total no of red balls = 4

Thus total no of balls = 6+4 = 10

(i) no of probable outcomes for even numbered ball = 5

⇒ probability $= \frac{5}{10}$

$= \frac{1}{2}$

(ii) no of probable outcomes of a white ball = 6

⇒ probability $= \frac{6}{10}$

$= \frac{3}{5}$

9. Question

A number is selected at random from integers 1 to 100. Find the probability that it is

(i) a perfect square (ii) not a perfect cube.

Answer

(i) no of perfect squares between 1 to 100 = 10

⇒ probability $= \frac{10}{100}$

$= \frac{1}{10}$

(iii) no of perfect cubes from 1 to 100 = 4

⇒ probability $= 1 - \frac{4}{100}$

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

$= \frac{24}{25}$

10. Question

For a sightseeing trip, a tourist selects a country randomly from Argentina, Bangladesh, China, Angola, Russia and Algeria. What is the probability that the name of the selected country will begin with A?

Answer

The probable outcomes for countries name beginning with A = 3

Total no of countries = 6

⇒ probability $= 3/6$

$= \frac{1}{2}$

11. Question

A box contains 4 Green, 5 Blue and 3 Red balls. A ball is drawn at random. Find the probability that the selected ball is (i) Red in colour (ii) not Green in colour.

Answer

No of green balls = 4

No of blue balls = 5

No of red balls = 3

Total no of balls = 4+5+3 = 12

(i) no of probable outcomes that the ball is red in colour = 3

⇒ probability $= \frac{3}{12}$

$= \frac{1}{4}$

(ii) no of green balls = 4

⇒ probability $= 1 - \frac{4}{12}$

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

$= \frac{2}{3}$

12. Question

20 cards are numbered from 1 to 20. One card is drawn at random. What is the probability that the number on the card is

(i) a multiple of 4 (ii) not a multiple of 6.

Answer

From 1 to 20, number of numbers divisible by 4 = 5

Total no of outcomes = 20

(i) probable outcomes of numbers divisible by 4 = 5

⇒ probability $= \frac{5}{20}$

$= \frac{1}{4}$

(ii) no of numbers divisible by 6 = 3

⇒ probability $= 1 - \frac{3}{20}$

$= \frac{17}{20}$

13. Question

A two digit number is formed with the digits 3, 5 and 7. Find the probability that the number so formed is greater than 57 (repetition of digits is not allowed).

Answer

Since repletion of digits is not allowed, total no of numbers formed with 3,5 7 = 3×2 = 6

No of numbers greater than 57 = 1×2 = 2

⇒ probability $= \frac{2}{6}$

$= \frac{1}{3}$

14. Question

Three dice are thrown simultaneously. Find the probability of getting the same number on all the three dice.

Answer

Total no of outcomes by throwing three dice = 6×6×6 = 256

Probable outcomes of all three same numbers on die = 6

⇒ probability $= \frac{6}{256}$

$= \frac{1}{36}$

15. Question

Two dice are rolled and the product of the outcomes (numbers) are found. What is the probability that the product so found is a prime number?

Answer

The outcomes on throwing a dice twice are: (1,1),(1,2),(1,3),(1,4),(1,5),(1,6)

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

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

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

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

(61),(6,2),(63),(6,4),(6,6),(6,6)

Total outcomes = 36

Probable outcome that the product is a prime number = 6

⇒ probability $= \frac{6}{36}$

$= \frac{1}{6}$

16. Question

A jar contains 54 marbles each of which is in one of the colours blue, green and white. The probability of drawing a blue marble is $\frac{1}{3}$ and the probability of drawing a green marble is $\frac{4}{9}$. How many white marbles does the jar contain?

Answer

probability of drawing a blue marble is $\frac{1}{3}$

the probability of drawing a green marble is $\frac{4}{9}$.

Total no of marbles = 54

Thus no of blue marbles $= \frac{54}{3} = 18$

No of green marbles $= \left(\frac{4}{9}\right)54 = 24$

Thus no of white marbles = 54-18-24 = 12

17. Question

A bag consists of 100 shirts of which 88 are good, 8 have minor defects and 4 have major defects. A trader A will accept only the shirt which are good, but the trader B will not accept the shirts which have major defects. One shirt is drawn at random. What is the probability that it is acceptable by (i) A (ii) B?

Answer

Total no of shirts = 100

No of good shirts = 88

No of minor defects = 8

No of major defects = 4

(i) In case of A the probable outcome = 88

⇒ probability $= \frac{88}{100}$

$= \frac{22}{25}$

(ii) in case of B no of probable outcomes = 88+8 = 96

⇒ probability $= \frac{96}{100}$

$= \frac{24}{25}$

18. Question

A bag contains 12 balls out of which x balls are white. (i) If one ball is drawn at random, what is the probability that it will be a white ball. (ii) If 6 more white balls are put in the bag and if the probability of drawing a white ball will be twice that of in (i), then find x.

Answer

Total no of balls = 12

No of white balls = x

(i) If one ball is drawn at random, the probability of it being white $= \frac{x}{12}$

If 6 more white balls are put in the bag and if the probability of drawing a white ball will be twice that of in(i)

$\Rightarrow \frac{x+6}{12+6} = 2.\frac{x}{12}$

$\Rightarrow \frac{x+6}{18} = \frac{x}{6}$

$\Rightarrow 2x = 6$

$\Rightarrow x = 3$

Probality $= \frac{3}{12}$

$= \frac{1}{4}$

(i) $\frac{1}{4}$

(ii) 3

19. Question

Piggy bank contains 100 fifty-paise coins, 50 one-rupee coins, 20 two-rupees coins and 10 five- rupees coins. One coin is drawn at random. Find the probability that the drawn coin

(i) will be a fifty-paise coin (ii) will not be a five-rupees coin.

Answer

Total no of coins = 100+50+20+10 = 180

No of 50 paise coins = 100

No of one rupee coins = 50

No of two rupees coins = 20

No of five rupees coins = 10

(i) Probable outcome that the coin is 50 paise coin = 100

$\Rightarrow$ probability $= \frac{100}{180}$

$= \frac{5}{9}$

(ii) Probable outcomes that it is a five rupee coin = 10

$\Rightarrow$ probability $= 1 - \frac{10}{180}$

$= 1 - \frac{1}{18}$

$= \frac{17}{18}$

Exercise 12.2

1. Question

If A and B are mutually exclusive events such that P (A) = $\frac{3}{5}$ and P (B) = $\frac{1}{5}$, then find P(A ∪ B).

Answer

$P(AUB) = P(A) + P(B) - P(A \cap B)$

$\Rightarrow P(AUB) = P(A) + P(B)$ since mutually exclusive

$\Rightarrow P(AUB) = \frac{3}{5} + \frac{1}{5}$

$\Rightarrow P(AUB) = \frac{4}{5}$

2. Question

If A and B are two events such that P (A) = $\frac{1}{4}$, P (B) = $\frac{2}{5}$ and P(A ∪ B) = $\frac{1}{2}$, then find P(A ∩ B).

Answer

$P(AUB) = P(A) + P(B) - P(A \cap B)$

$\Rightarrow \frac{1}{2} = \frac{1}{4} + \frac{2}{5} - P(A \cap B)$

$\Rightarrow \frac{1}{2} - \left(\frac{1}{4} + \frac{2}{5}\right) = -P(A \cap B)$

$\Rightarrow \frac{3}{20} = P(A \cap B)$

Required solution,

3. Question

If P (A) = $\frac{1}{2}$, P (B) = $\frac{7}{10}$, P(A ∪ B) = 1. Find (i) P(A ∩ B) (ii) P(A’ ∪ B’).

Answer

$P(AUB) = P(A) + P(B) - P(A \cap B)$

(i)$\Rightarrow 1 - \left(\frac{1}{2} + \frac{7}{10}\right) = P(A \cap B)$

$\Rightarrow \frac{1}{5} = P(A \cap B)$

(ii)$P\left(A' \cup B'\right) = P(AUB) - P(A \cap B)$

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

$= \frac{4}{5}$

4. Question

If a die is rolled twice, find the probability of getting an even number in the first time or a total of 8.

Answer

The outcomes on throwing a dice twice are: (1,1),(1,2),(1,3),(1,4),(1,5),(1,6)

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

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

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

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

(61),(6,2),(63),(6,4),(6,6),(6,6)

Total outcomes = 36

Probable outcome that the even number in the first time or a total of 8.

comes = 20

⇒ probability $= \frac{20}{36}$

$= \frac{5}{9}$

5. Question

One number is chosen randomly from the integers 1 to 50. Find the probability that it is divisible by 4 or 6.

Answer

$\frac{8}{25}$

6. Question

A bag contains 50 bolts and 150 nuts. Half of the bolts and half of the nuts are rusted. If an item is chosen at random, find the probability that it is rusted or that it is a bolt.

Answer

No of bolts = 50

No of nuts = 150

Total no of things = 150+50 = 200

No of rusted bolts = 25

No of rusted nuts = 75

Probable outcomes = (50)+75

= 125

⇒ probability $= \frac{125}{200}$

$= \frac{5}{8}$

7. Question

Two dice are rolled simultaneously. Find the probability that the sum of the numbers on the faces is neither divisible by 3 nor by 4.

Answer

The outcomes on throwing a dice twice are: (1,1),(1,2),(1,3),(1,4),(1,5),(1,6)

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

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

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

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

(61),(6,2),(63),(6,4),(6,6),(6,6)

Total outcomes = 36

Probable outcome that the sum of the numbers on the faces is neither divisible by 3 nor by 4.

comes = 16

⇒ probability = $\frac{16}{36}$

$= \frac{4}{9}$

8. Question

A basket contains 20 apples and 10 oranges out of which 5 apples and 3 oranges are rotten. If a person takes out one fruit at random, find the probability that the fruit is either an apple or a good fruit.

Answer

Total no of fruits = 30

No of apples = 20

No of rotten apples = 5

Thus no of good apples = 15

No of oranges = 10

No of rotten oranges = 3

Thus no of good oranges = 7

probability that the fruit is either an apple or a good fruit $\frac{15+5+7}{30}$

$= \frac{27}{30}$

$= \frac{9}{10}$

9. Question

In a class, 40% of the students participated in Mathematics-quiz, 30% in Science-quiz and 10% in both the quiz programmes. If a student is selected at random from the class, find the probability that the student participated in Mathematics or Science or both quiz programmes.

Answer

Let the probability of students participating in mathematics be P(A) ad that in science be P(B).

P(A) = 0.4

P(B) = 0.3

P (A **∩B) = 0.1**

P(AUB) = P(A)+P(B)- P(A **∩B)**

= 0.4+0.3-0.1

= 0.6

$= \frac{6}{10} = \frac{3}{5}$

Thus the probability is $\frac{3}{5}$

10. Question

A card is drawn at random from a well-shuffled deck of 52 cards. Find the probability that it will be a spade or a king.

Answer

No of spades = 13 out of which 1 I king

Thus no of spades without king = 12

No of kings = 4

Total no of cards = 52

probability that it will be a spade or a king $= \frac{12+4}{52}$

$= \frac{16}{52}$

$= \frac{4}{13}$

11. Question

A box contains 10 white, 6 red and 10 black balls. A ball is drawn at random. Find the probability that the ball drawn is white or red.

Answer

Total no of balls = 26

No of white balls = 10

No of red balls = 6

No of black balls = 10

probability that the ball drawn is white or red $= \frac{10+6}{26}$

$= \frac{16}{26}$

$= \frac{8}{13}$

12. Question

A two digit number is formed with the digits 2, 5, 9 (repetition is allowed). Find the probability that the number is divisible by 2 or 5.

Answer

Since repetition is allowed, the number of 2 digit numbers formed

$= 3^2$

$= 9$

If a number is divisible by 2 or 5 the unit place should be 2 or 5. Thus probable no of words$= 3.2 = 6$

Probability $= \frac{6}{9}$

$= \frac{2}{3}$

13. Question

Each individual letter of the word “ACCOMMODATION” is written in a piece of paper, and all 13 pieces of papers are placed in a jar. If one piece of paper is selected at random from the jar, find the probability that

(i) the letter ‘A’ or ‘O’ is selected.

(ii) the letter ‘M’ or ‘C’ is selected.

Answer

Total no of letters = 13

No of A = 2

No of C = 2

No f O = 3

No of M = 2

(i) probability that A or O is selected = $\frac{5}{13}$

(ii) probability that M or C is selected = $\frac{4}{13}$

14. Question

The probability that a new car will get aaward for its design is 0.25, the probability that it will get an award for efficient use of fuel is 0.35 and the probability that it will get both the awards is 0.15. Find the probability that

(i) it will get atleast one of the two awards

(ii) it will get only one of the awards.

Answer

Let the probability of winning the award for design be P(A) and that for efficient use of fuel be P(B)

P(A) = 0.25

P(B) = 0.35

P(A **∩B) = 0.15**

(i) probability that it will get at least one of the two awards

P(AUB) = P(A)+P(B)- P(A **∩B)**

= 0.25+0.35-0.15

= 0.45

(ii) probability of getting only oner = P(A)+P(B)-2. P(A **∩B)**

= 0.25+0.35-2(0.15)

= 0.3

15. Question

The probability that A, B and C can solve a problem are $\frac{4}{5}, \frac{2}{3}$ and $\frac{3}{7}$ respectively. The probability of the problem being solved by A and B is $\frac{8}{15}$, B and C is $\frac{2}{7}$, A and C is $\frac{12}{35}$. The probability of the problem being solved by all the three is $\frac{8}{35}$. Find the probability that the problem can be solved by atleast one of them.

Answer

Given:

P(A) = $\frac{4}{5}$

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

P(C) = $\frac{3}{7}$

P(A ∩B) = $\frac{8}{15}$

P(B ∩C) = $\frac{2}{7}$

P(A ∩C) = $\frac{12}{37}$

P(A ∩B ∩C) = $\frac{8}{35}$

Thus

P(AUBUC) = P(A)+P(B)+P(C)+ P(A **∩B)+** P(C **∩B)+** P(A **∩C)-** P(A **∩B ∩C)**

$= \frac{4}{5}+\frac{2}{3}+\frac{2}{7}+\frac{8}{15}+\frac{2}{7}+\frac{12}{37}-\frac{8}{35}$

$= \frac{101}{105}$

Exercise 12.3

1. Question

If ϕ is an impossible event, then P(ϕ) =

A. 1

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

C. 0

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

Answer

P(ϕ) = 0 since ϕ is an impossible event.

2. Question

If S is the sample space of a random experiment, then P(S) =

A. 0

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

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

D. 1

Answer

Since S is the sample space thus P(S) = 1

3. Question

If p is the probability of an event A, then p satisfies

A. $0 < p < 1$

B. $0 \leq p \leq 1$

C. $0 \leq p < 1$

D. $0 < p \leq 1$

Answer

Probability always lies between 0 and 1.

Hence, P(A) = p

$\Rightarrow 0 \leq p \leq 1$

4. Question

Let A and B be any two events and S be the corresponding sample space.

Then $P\left(\overline{A} \cap B\right)$ =

A. P(B) – P(A ∩ B)

B. P(A ∩ B) – P(B)

C. P (S)

D. P [(A ∪ B)']

Answer

$P\left(\overline{A} \cap B\right) = P(B) - P(A \cap B)$

As $P\left(\overline{A} \cap B\right)$ implies the portion of only event B. hence event A and the intersection between these two are not counted.

5. Question

The probability that a student will score centum in mathematics is $\frac{4}{5}$. The probability that he will not score centum is

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

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

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

D. $\frac{4}{5}$

Answer

The probability that a student will score centum in mathematics is $\frac{4}{5}$.

Thus probability that he will not score centum is

$= 1 - \frac{4}{5}$

$= \frac{1}{5}$

6. Question

If A and B are two events such that

P (A) = 0.25, P (B) = 0.05 and P(A ∩ B) = 0.14, then P(A ∪ B) =

A. 0.61

B. 0.16

C. 0.14

D. 0.6

Answer

$P(A \cup B)$ = P (A)+ P (B)- $P(A \cap B)$

⇒ $P(A \cup B)$ = 0.25+0.05-0.14 = 0.16

7. Question

There are 6 defective items in a sample of 20 items. One item is drawn at random. The probability that it is a non-defective item is

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

B. 0

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

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

Answer

No of defective items = 6

Total no of samples = 20

Probability that the item is not defective = 1-6/20

$= \frac{7}{10}$

8. Question

If A and B are mutually exclusive events and S is the sample space such that

$P(A) = \frac{1}{3}P(B)$ and S = A ∪ B, then P (A) =

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

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

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

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

Answer

Since the event are mutually exclusive the intersection is 0.

Thus P(AUB) = P(A)+P(B)

⇒ P(AUB) = P(A)+3.P(A)

⇒ 1 = 4.P(A)

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

9. Question

The probabilities of three mutually exclusive events A, B and C are given by $\frac{1}{3}, \frac{1}{4}$ and $\frac{5}{12}$. Then P(A ∪ B ∪ C) is

A. $\frac{19}{12}$

B. $\frac{11}{12}$

C. $\frac{7}{12}$

D. 1

Answer

Since the events are mutually exclusive the intersections between the respective events will be 0.

P(AUBUC) = P(A)+P(B)+P(C)

$= \frac{1}{3}+\frac{1}{4}+\frac{5}{12}$

$= 1$

10. Question

If P(A) = 0.25, P (B) = 0.50, P(A ∩ B) = 0.14 then P (neither A nor B) =

A. 0.39

B. 0.25

C. 0.11

D. 0.24

Answer

P(AUB) = 0.25-0.50-0.14 = 0.61

Thus P (neither A nor B) = 1-P(AUB) = 1-0.61 = 0.39

11. Question

A bag contains 5 black balls, 4 white balls and 3 red balls. If a ball is selected at random, the probability that it is not red is

A. $\frac{5}{12}$

B. $\frac{4}{12}$

C. $\frac{3}{12}$

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

Answer

Total no of balls = 12

No of black balls = 5

No of white balls = 4

No of red balls = 3

Probability thst the ball is not red

$= \frac{5+4}{12}$

$= \frac{9}{12}$

$= \frac{3}{4}$

12. Question

Two dice are thrown simultaneously. The probability of getting a doublet is

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

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

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

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

Answer

The outcomes on throwing a dice twice are: (1,1),(1,2),(1,3),(1,4),(1,5),(1,6)

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

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

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

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

(61),(6,2),(63),(6,4),(6,6),(6,6)

Total outcomes = 36

Probable outcome of a duplet = 6

⇒ probability = $\frac{6}{36}$

$= \frac{1}{6}$

13. Question

A fair die is thrown once. The probability of getting a prime or composite number is

A. 1

B. 0

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

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

Answer

Total outcomes = 6

Thee are 5 numbers which satisfy the prime and composite: 2,3,4,5,6

Thus probability

$= \frac{5}{6}$

14. Question

Probability of getting 3 heads or 3 tails in tossing a coin 3 times is

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

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

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

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

Answer

The outcomes when three coins are tossed aare:(H H H) (H H T) (H T H) (T H H) (T T H) (T H T) (H T T) (T T T)

No of probable outcomes of getting of 3 heada or 3 tails = 2

⇒ probability = $\frac{2}{8}$

$= \frac{1}{4}$

15. Question

A card is drawn from a pack of 52 cards at random. The probability of getting neither an ace nor a king card is

A. $\frac{2}{13}$

B. $\frac{11}{13}$

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

D. $\frac{8}{13}$

Answer

No of ace and king cards = 4+4 = 8

Total no of cards = 52

Thus no of cards neither ace nor king = 52-8 = 44

Probability

$= \frac{44}{52}$

$= \frac{11}{13}$

16. Question

The probability that a leap year will have 53 Fridays or 53 Saturdays is

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

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

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

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

Answer

Leap year has 52 weeks and 2 more days. For 53 Fridays those two should be Thursday, Friday or Friday, Saturday. Hence probability of 53 Fridays $\frac{2}{7}$

Similarly probability of 53 Saturdays $= \frac{1}{7}$

Let these two events be A and B respectively.

Now A and B can't occur simultaneously as there can't be any pair consisting of Friday and Saturday.

So P(A or B) = P(A)+P(B)-P(AB) = $= \frac{2}{7} + \frac{2}{7} - \frac{1}{7} = \frac{3}{7}$

17. Question

The probability that a non-leap year will have 53 Sundays and 53 Mondays is

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

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

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

D. 0

Answer

Since it is a non leap year thus there cannot be 53 number of Sundays and Mondays each. Thus its probability is 0.

18. Question

The probability of selecting a queen of hearts when a card is drawn from a pack of 52 playing cards is

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

B. $\frac{16}{52}$

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

D. $\frac{1}{26}$

Answer

There are 13 hearts of which 1 is queen of hearts out of 52.

probability of selecting a queen of hearts when a card is drawn from a pack of 52 playing cards is

$\frac{1}{52}$

19. Question

Probability of sure event is

A. 1

B. 0

C. 100

D. 0.1

Answer

Since the event is sure, the probability of a sure event = 1.

20. Question

The outcome of a random experiment results in either success or failure. If the probability of success is twice the probability of failure, then the probability of success is

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

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

C. 1

D. 0

Answer

Let the probability of failure be x, then the probability of success is 2x.

Thus probability of success = $\frac{2x}{3x}$

$= \frac{2}{3}$