

Class: 11
Subject: Mathematics
Topic: Probability
No. of Questions: 20
Duration: 60 Min
Maximum Marks: 60

1. A bag contains 7 white and 9 blue balls. If two balls are drawn at random, what is the chance that one ball is white and the other is blue?
- A. 16/63
B. 1/8
C. 7/20
D. 21/40

Right Answer Explanation: D

$$\text{Required probability} = \frac{{}^7C_1 \times {}^9C_1}{{}^{16}C_2} = \frac{21}{40}$$

2. In how many ways can you choose a captain and a vice-captain from a cricket team of 11 players?
- A. 110
B. 121
C. 22
D. None of these

Right Answer Explanation: A

The captain can be chosen in 11 ways.
Vice captain can be chosen in 10 ways.
Required number of ways = $11 \times 10 = 110$

3. The probabilities of the three doctors A, B and C getting success in an operation are 0.5, 0.2 and 0.3 respectively. Find the probability that the operation is not successful.
- A. 0.78
B. 0.64
C. 0.56
D. 0.28

Right Answer Explanation: D

Since A, B or C could do the operation independently, these are mutually exclusive events. Therefore, the required probability is $(1 - 0.5) \times (1 - 0.2) \times (1 - 0.3) = 0.28$.

4. In a box there are 2 red, 3 black and 4 white balls. Out of these, three balls are drawn together. The probability of the balls being drawn of the same colour is

- A. $\frac{1}{84}$
B. $\frac{1}{21}$
C. $\frac{5}{84}$
D. None of these

Right Answer Explanation: C

Total number of equally likely cases

$$= {}^9C_3 = \frac{9 \times 8 \times 7}{1 \times 2 \times 3} = 3 \times 4 \times 7 = 84$$

$$\text{Favorable case} = {}^3C_3 + {}^4C_3 = 1 + 4 = 5$$

$$\therefore \text{Required probability} = \frac{5}{84}$$

5. The probability that a man lives after 10 years is $\frac{1}{4}$ and that his wife is alive after 10 years is $\frac{1}{3}$. The probability that neither of them is alive after 10 years is

- A. $\frac{1}{2}$
B. $\frac{1}{12}$
C. $\frac{7}{12}$
D. $\frac{3}{4}$

Right Answer Explanation:

$$P(M) = \frac{1}{4}, P(W) = \frac{1}{3}$$

$$P(\bar{M}) = 1 - \frac{1}{4} = \frac{3}{4}, P(\bar{W}) = 1 - \frac{1}{3} = \frac{2}{3}$$

$$\text{Reqd. prob.} = P(\bar{M}) \cdot P(\bar{W}) = \frac{3}{4} \cdot \frac{2}{3} = \frac{1}{2}$$

6. The probability that a marksman will hit a target is given as $\frac{1}{5}$. Then the probability of at least one hit in 10 shots is:

- A. $1 - \left(\frac{4}{5}\right)^{10}$
B. $\frac{1}{5^{10}}$
C. $1 - \frac{1}{5^{10}}$
D. $\left(\frac{4}{5}\right)^{10}$

Right Answer Explanation: A

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

$\therefore q = 1 - \frac{1}{5} = \frac{4}{5}$ is the prob. that none will hit in 10 shots

\therefore reqd. prob. = $1 - \left(\frac{4}{5}\right)^{10}$

7. Three identical dice are rolled. The probability that the same number will appear on each of them is:

- A. $\frac{1}{6}$
B. $\frac{1}{36}$
C. $\frac{1}{18}$
D. $\frac{3}{28}$

Right Answer Explanation: B

$$\text{Reqd. prob.} = \frac{6}{6 \times 6 \times 6} = \frac{1}{36}$$

[\therefore favourable case are (1, 1, 1), (2, 2, 2), (3, 3, 3), (4, 4, 4), (5, 5, 5), (6, 6, 6)]

Hence (2) is the correct answer

8. The probability of having at least one tail in 4 throws with a coin is:

- A. $\frac{15}{16}$
B. $\frac{1}{16}$
C. $\frac{1}{4}$
D. 1

Right Answer Explanation: A

Prob. with no tail in 4 throws

$$= \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{16}$$

∴ prb with at least one tail

$$= 1 - \frac{1}{16} = \frac{15}{16}$$

9. Two dice are thrown simultaneously, the probability that the numbers on them are different is

- A. 5/6
B. 1/4
C. 1/2
D. 9/13

Right Answer Explanation: A

Prob. of getting the same no. on the two faces = $6/36 = 1/6$

Required event is its compliment = $1 - 1/6 = 5/6$

10. If a card is drawn at random from a packet of 100 cards numbered 1 to 100, the probability of drawing a number on the card that is a cube is

- A. 3/100
B. 1/25
C. 9/100
D. 1/10

Right Answer Explanation: B

Cubes in between 1 and 100 = 1, 8, 27, 64 = 4 in no.

So, required probability is $4/100 = 1/25$

11. Two letters are selected at random from the set of English alphabets, what is the probability that both are vowels?

- A. $3/65$
- B. $1/13$
- C. $2/5$
- D. $2/65$

Right Answer Explanation: D

Selecting 2 alphabets from 26 alphabets, $n(s)=(26.25)/2=325$

Selecting 2 from 5 vowels, $n(a)=(5.4)/2=10$

Required probability= $10/325=2/65$

12. Three unbiased coins are tossed together, the probability of getting atleast one tail is

- A. $1/8$
- B. $3/4$
- C. $3/8$
- D. $7/8$

Right Answer Explanation: D

Prob of getting no tail = $1/8$

Reqd. prob. = $1 - 1/8 = 7/8$

13. The probability that in a family of four children, there will be atleast one boy, is

- A. $1/16$
- B. $3/16$
- C. $13/16$
- D. $15/16$

Right Answer Explanation: D

The total no. of sample points $n(S) = 2^4 = 16$

Reqd. prob. = $1 - \text{probability of having no boy child} = 1 - (1/16) = 15/16$

14. If two dice are thrown, then the probability of getting 5 on none of them is

- A. $1/2$
- B. $11/36$
- C. $25/36$
- D. $1/3$

Right Answer Explanation: C

A is the event of not getting 5 on any die $n(A) = 5 \times 5 = 25$

$n(S) = 6 \times 6 = 36$

Required probability = $25/36$

15. If four coins are tossed, what are the chances that there will be two heads and two tails?

- A. 5/16
- B. 1/4
- C. 3/16
- D. 3/8

Right Answer Explanation: D

Total number of outcomes = $2^4 = 16$

Number of favorable outcomes = (HHTT), (HTHT), (HTTH), (TTHH), (THTH), (THHT) = 6

$$\text{Probability} = \frac{6}{16} = \frac{3}{8}$$

16. A bag contains 3 different white, 4 different black and 2 different red balls. Two balls are chosen at random. What is the probability that (a) one white and one red ball is chosen, (b) no white ball is chosen, (c) exactly one black ball is chosen?

- A. 1/6, 5/36, 4/9
- B. 5/6, 21/36, 5/9
- C. 1/6, 5/12, 5/9
- D. None of these

Right Answer Explanation: C

Total number of outcomes = ${}^9C_2 = 36$

(a) Number of favourable outcomes = $({}^3C_1)({}^2C_1) = 6$; Probability = $\frac{6}{36} = \frac{1}{6}$

(b) Probability that a white ball is chosen = $\frac{{}^3C_2 + {}^3C_1 \cdot {}^6C_1}{{}^9C_2} = \frac{21}{36}$

Probability that no white ball is chosen = $1 - \frac{21}{36} = \frac{15}{36} = \frac{5}{12}$

(c) Number of favourable outcomes = $({}^4C_1)({}^5C_1) = 20$; Probability = $\frac{20}{36} = \frac{5}{9}$

17. A bag contains 5 red and 7 green balls. Two balls are drawn from the bag at random with replacement. The probability of drawing a red and a green ball in succession is

- A. 14/22
- B. 35/144
- C. 49/144
- D. 7/22

Right Answer Explanation:

Red = 5 ; green = 7

Total ball = 12

Required. probability = $(5/12) (7/12) = 35/144$

18. Find the probability that a number selected at random in between 1 to 20 is divisible by either 3 or 5.

- A. $\frac{2}{5}$
- B. $\frac{3}{5}$
- C. $\frac{4}{9}$
- D. $\frac{5}{9}$

Right Answer Explanation: C

Numbers divisible by 3 or 5 in between 1 to 20 are 3,6,9,12,15,18,5,10

Total=8

Reqd. prob.= $\frac{8}{20} = \frac{4}{9}$

19. A speaks the truth in 60 percent cases and B speaks the truth in 70 percent cases. The probability that they will say the same thing while describing a single event is

- A. 0.56
- B. 0.54
- C. 0.38
- D. 0.94

Right Answer Explanation: B

For the required event, either both of them should speak the truth or both of them should tell a lie.

Probability of the required event

$$= (0.6)(0.7) + (0.4)(0.3)$$

$$= 0.42 + 0.12 = 0.54$$

20. The probability that a leap year selected at random will have 53 Sundays is

- a. $\frac{1}{7}$
- b. $\frac{2}{7}$
- c. $\frac{3}{7}$
- d. None of these

Sol: B

Sol A leap year has 366 days i.e. 52 weeks and 2 more days.

Hence it will have 53 Sundays if one of the two additional days is a Sunday. The additional days can be Sunday and Monday, Monday and Tuesday, Tuesday and Wednesday, Wednesday and Thursday, Thursday and Friday, Friday and Saturday, Saturday and Sunday.

$$\therefore \text{required probability } = \frac{2}{7}$$