

## Previous Year Questions 2024

**Q1: A bag contains 3 red balls, 5 white balls and 7 black balls. The probability that a ball drawn from the bag at random will be neither red nor black is: (CBSE 2024)**

- (a)  $1/3$
- (b)  $1/5$
- (c)  $7/15$
- (d)  $8/15$

**Ans: (a)**

No. of red balls = 3

No. of white balls = 5

No. of black balls = 7

Total balls = 15

Probability that ball drawn is neither red nor black =  $5/15 = 1/3$

**Q2: The probability of getting a bad egg in a lot of 400 eggs is 0.045. The number of good eggs in the lot is: (CBSE 2024)**

- (a) 18
- (b) 180
- (c) 382
- (d) 220

**Ans: (c)**

Probability of getting bad in the lot = 0.045

Let the no. of bad eggs = x

$\therefore$  Probability of bag eggs

$$= \frac{\text{No. of bad eggs}}{\text{Total eggs}}$$

$$\Rightarrow 0.045 = x/400$$

$$\Rightarrow x = 400 \times 0.045$$

$$\Rightarrow x = 18$$

No. of bad eggs = 18

No. of good eggs =  $400 - 18$

$$= 382$$

**Q3: Two dice are thrown together. The probability that they show different numbers is: (CBSE 2024)**

- (a)  $1/6$
- (b)  $5/6$
- (c)  $1/3$
- (d)  $2/3$

**Ans: (b)**

Total outcomes, when two dice are thrown

$$= \{(1, 1)(1, 2)(1, 3)(1, 4)(1, 5)(1, 6)$$

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

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

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

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

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

$$\text{Favourable outcomes} = \{(1, 2)(1, 3)\dots(2, 1), (2, 3)\dots(3, 1)(3, 2)(3, 4)\dots(4, 1)\dots(6, 5)\}$$

$$\text{No. of favourable outcomes} = 30$$

$$\text{Total outcomes} = 36$$

$$\text{So, } P(E) = 30/36$$

$$= 5/6$$

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**Ans: (a)**

No. of red balls = 3

No. of white balls = 5

No. of black balls = 7

Total balls = 15

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$$\Rightarrow x = 400 \times 0.045$$

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- (c)  $1/3$
- (d)  $2/3$

**Ans: (b)**

Total outcomes, when two dice are thrown

$$= \{(1, 1)(1, 2)(1, 3)(1, 4)(1, 5)(1, 6)$$

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

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

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

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

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

$$\text{Favourable outcomes} = \{(1, 2)(1, 3)\dots(2, 1), (2, 3)\dots(3, 1)(3, 2)(3, 4)\dots(4, 1)\dots(6, 5)\}$$

$$\text{No. of favourable outcomes} = 30$$

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$$\text{So, } P(E) = 30/36$$

$$= 5/6$$

**Q4: Assertion (A):** In a cricket match, a batsman hits a boundary 9 times out of 45 balls he plays. The probability that in a given ball, he does not hit the boundary is  $\frac{4}{5}$ .

**Reason (R):**  $P(E) + P(\text{not } E) = 1$ . (CBSE 2024)

- (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).  
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).  
(c) Assertion (A) is true but reason (R) is false.  
(d) Assertion (A) is false but reason (R) is true.

**Ans: (a) Assertion:**

Total balls (outcomes) = 45

No. of times boundaries hit = 9

(E = hitting the boundary) =  $\frac{9}{45}$

$= \frac{1}{5}$

$\therefore P(E = \text{not hitting the boundary})$

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

**Reason:** This is a fundamental property of probability:

The sum of the probability of an event  $P(E)$  and the probability of its complement  $P(\text{not } E)$  is always equal to 1.

Thus, Reason (R) is also **true**.

## Previous Year Questions 2023

**Q5: In a group of 20 people. 5 can't swim. If one person is selected at random, then the probability that he/she can swim is (2023)**

- (a)  $\frac{3}{4}$   
(b)  $\frac{1}{3}$   
(c) 1  
(d)  $\frac{1}{4}$

**Ans: (a)**

Total number of people = 20

Number of people who can't swim = 5

Number of people who can swim =  $20 - 5 = 15$

$\therefore$  Required probability =  $\frac{15}{20} = \frac{3}{4}$

**Q6: The probability of happening of an event is denoted by p and the probability of non-happening of the event is denoted by q. The relation between p and q is (2023)**

- (a)  $p + q = 1$   
(b)  $p = 1, q = 1$   
(c)  $p = q - 1$   
(d)  $p + p + 1 = 0$

**Ans: (a)**

Probability of happening of an event + Probability of non - happening of an event

$\therefore p + q = 1$

**Q7: A girl calculates that the probability of her winning the first prize in a lottery is 0.08. If 6000 tickets are sold, how many tickets has she bought? (2023)**

- (a) 40  
(b) 240  
(c) 480  
(d) 750

**Ans:** (c)

Probability of winning first prize = Ticket bought by girl / Total ticket sold

$$\Rightarrow 0.08 = \text{Ticket bought by girl} / 6000$$

$$\Rightarrow \text{Ticket bought by girl} = 0.08 \times 6000 = 480$$

**Q8: Two dice are thrown together. The probability of getting the difference of numbers on their upper faces equals to 3 is (CBSE 2023)**

(a)  $1/9$

(b)  $2/9$

(c)  $1/6$

(d)  $1/12$

**Ans:** (c)

Total number of outcomes =  $6 \times 6 = 36$

Favourable outcomes are  $\{(1,4), (2,5), (3,6), (4,1), (5,2), (6,3)\}$  i.e., 6 in number

$$\therefore \text{Required probability} = 6/36 = 1/6$$

**Q9: A card is drawn at random from a well-shuffled pack of 52 cards. The probability that the card drawn is not an ace is (2023)**

(a)  $1/13$

(b)  $9/13$

(c)  $4/13$

(d)  $12/13$

**Ans:** (d)

Total number of cards = 52

Number of ace card = 4

$$\therefore \text{Number of non ace card} = 52 - 4 = 48$$

$$\therefore \text{Required probability} = 48/52 = 12/13$$

**Q10: DIRECTIONS: In the question, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option out of the following: (CBSE 2023)**

**Assertion (A):** The probability that a leap year has 53 Sundays is  $2/7$ .

**Reason (R):** The probability that a non-leap year has 53 Sundays is  $5/7$ .

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true.

**Ans:** (c)

The leap year has 366 days, i.e, 52 weeks and 2 days.

$$\therefore \text{Required probability} = 2/7$$

The non-leap year has 365 days. i.e.. 52 weeks and 1 day.

$$\therefore \text{Required probability} = 1/7$$

Therefore, assertion is true but reason is false.

**Q11: A bag contains 5 red balls and n green balls. If the probability of drawing a green ball is three times that of a red ball, then the value of n is (2023)**

(a) 18

(b) 15

(c) 10

(d) 20

**Ans:** (b)

Probability of drawing a green ball = 3 x Probability of drawing a red ball

$$\frac{n}{5+n} = 3 \times \frac{5}{5+n}$$

Cancel the denominator 5+n (since it is common and non-zero):

$$n = 3 \times 5$$

$$\therefore n = 15$$

**Q12: A bag contains 4 red, 3 blue and 2 yellow balls. One ball is drawn at random from the bag. Find the probability that the drawn ball is (i) red and (ii) yellow. (2023)**

**Ans:** Number of red balls = 4

Number of blue balls = 3

Number of yellow balls = 2

Total number of balls = 4 + 3 + 2 = 9

(i) P(drawing a red ball) = 4/9

(ii) P(drawing a yellow ball) = 2/9

**Q13: If a fair coin is tossed twice, find the probability of getting 'almost one head'. (CBSE 2023)**

**Ans:** Let A be the event of getting at most one head, and S be the sample space.

S = {HH, HT, TH, TT} and A = {HT, TH, TT}

$$\Rightarrow n(S) = 4$$

$$\text{Also, } n(A) = 3$$

$$\text{Required probability} = n(A) / n(S)$$

$$= 3/4$$

## Previous Year Questions 2022

**Q14: The probability of getting two heads when two fair coins are tossed together, is (2022)**

(a) 1/3

(b) 1/4

(c) 1/2

(d) 1

**Ans:** (b)

Sample space = {(H,H), (H,T), (T,H), (T,T)}

 $\therefore$  Number of total outcomes = 4

Favourable outcomes = {(H,H)}

 $\therefore$  Number of favourable outcomes = 1 $\therefore$  Required probability = 1/4

**Q15: In a single throw of a die, the probability of getting a composite number is (2022)**

(a) 1/3

(b) 1/2

(c) 2/3

(d) 5/6

**Ans:** (a)

Sample space = {1, 2, 3, 4, 5, 6}

∴ Number of total outcomes = 6

Favourable outcomes = {4, 6}

∴ Number of favourable outcomes = 2

∴ Required probability =  $2/6 = 1/3$

**Q16: The probability that a non-leap year has 53 Wednesdays, is (2022)**

(a)  $1/7$

(b)  $2/7$

(c)  $5/7$

(d)  $6/7$

**Ans:** (a)

We know that there are 52 complete weeks in 364 days

Since, it is non leap year.

So, there will be 52 Wednesdays and remaining  $365^{\text{th}}$  day may be any of the days of week

So, total number of ways = 7

∴ Number of favourable outcomes = 1

∴ Required probability =  $1/7$

**Q17: From the letters of the word "MANGO", a letter is selected at random. The probability that the letter is a vowel, is (2022)**

(a)  $1/5$

(b)  $3/5$

(c)  $2/5$

(d)  $4/5$

**Ans:** (c)

Total number of letters in the word MANGO are 5.

So, number of total outcomes = 5

Vowels in the word 'MANGO' are A, O

So, number of favourable outcomes = 2

∴ Required probability =  $2/5$

## Previous Year Questions 2021

**Q18: Case study-based questions is compulsory. Attempt any 4 sub-parts from question. Each sub-part carries 1 mark. (2021)**

During summer break, Harish wanted to play with his friends but it was too hot outside, so he decided to play some indoor game with his friends. He collects 20 identical cards and writes the numbers 1 to 20 on them (one number on one card). He puts them in a box. He and his friends make a bet for the chances of drawing various cards out of the box. Each was given a chance to tell the probability of picking one card out of the box.

**Based on the above, answer the following questions:**

**(i) The probability that the number on the card drawn is an odd prime number, is**

(a)  $3/5$

(b)  $2/5$

(c)  $9/20$

(d)  $7/20$

**Ans:** (d)

Card numbered from {1, 2, 3, ..., 20}

Total number of possible outcomes = 20

Odd prime numbers from 1 to 20 = {3, 5, 7, 11, 13, 17, 19}

Total number of favourable outcomes = 7

Hence, the probability that the number on the card drawn is an odd prime number =  $\frac{7}{20}$

**(ii) The probability that the number on the card drawn is a composite number is**

(a)  $\frac{11}{20}$

(b)  $\frac{3}{5}$

(c)  $\frac{4}{5}$

(d)  $\frac{1}{2}$  [2021, 1 Mark]

**Ans: (a)**

Total number of composite numbers between 1 to 20 = {4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20}

Total number of favourable outcomes = 11

So, the probability that the number on the drawn card is a composite number =  $\frac{11}{20}$

$\therefore$  Required Probability =  $\frac{11}{20}$

**(iii) The probability that the number on the card drawn is a multiple of 3, 6 and 9 is**

(a)  $\frac{1}{20}$

(b)  $\frac{1}{10}$

(c)  $\frac{3}{20}$

(d) 0

**Ans: (c)**

Multiple of 3 = {3, 6, 9, 12, 15, 18}

Multiple of 6 = {6, 12, 18}

Multiple of 9 = {9, 18}

Total number of favourable outcomes = 1

Hence the probability that the card is a multiple of 3, 6 and 9 =  $\frac{1}{20}$

$\therefore$  Required Probability =  $\frac{1}{20}$

**(iv) The probability that the number on the card drawn is a multiple of 3 and 7 is**

(a)  $\frac{3}{10}$

(b)  $\frac{1}{10}$

(c) 0

(d)  $\frac{2}{5}$  [2021, 1 Mark]

**Ans: (c)**

Multiple of 3 between 1 to 20 = {3, 6, 9, 12, 15, 18}

Multiple of 7 between 1 to 20 = {7, 14}

$\therefore$  Multiple of 3 and 7 = 0

$\therefore$  Total number of favourable outcomes = 0/20

$\therefore$  Required Probability = 0

**(v) If all cards having odd numbers written on them are removed from the box and then one card is drawn from the remaining cards, the probability of getting a card having a prime number is**

(a)  $\frac{1}{20}$

(b)  $\frac{1}{10}$

(c) 0

(d)  $\frac{1}{5}$

**Ans: (b)**

If all odd number cards are removed then remaining cards which are left = {2, 4, 6, 8, 10, 12, 14, 16, 18, 20}

Now, prime number cards in remaining cards = 1

So, the probability of getting a prime number from the remaining cards =  $\frac{1}{10}$



## Previous Year Questions 2020

**Q19: The probability of an event that is sure to happen, is \_\_\_\_\_. (2020)**

**Ans:** The probability of an event that is sure to happen is 1.

**Q20: If the probability of an event E happening is 0.023, then  $P(\bar{E})$  = \_\_\_\_\_. (2020)**

**Ans:** Given,  $P(E) = 0.023$

$$P(\bar{E}) = 1 - P(E) = 1 - 0.023 = 0.977$$

**Q21: A letter of English alphabet is chosen at random. What is the probability that the chosen letter is a consonant? (CBSE 2020)**

**Ans:** Total number of English alphabets = 26

Number of consonants = 26 - 5 = 21

$\therefore$  Number of favourable outcomes = 21

$P(\text{chosen letter is a consonant}) = 21/26$

**Q22: A die is thrown once. What is the probability of getting a number less than 3? (2020)**

**Ans:** Total number of outcomes = 6

Favourable outcomes are {1, 2} i.e., 2 in number

$\therefore$  Required probability =  $2/6 = 1/3$

**Q23: If the probability of winning a game is 0.07, what is the probability of losing it? (2020)**

**Ans:** Given, probability of winning a game is 0.07

$\therefore$  Probability of losing it =  $1 - 0.07 = 0.93$

**Q24: A jar contains 18 marbles. Some are red and others are yellow. If a marble is drawn at random from the jar, the probability that it is red is  $2/3$ . Find the number of yellow marbles in the jar. (2020)**

**Ans:** There are 18 marbles in the jar.

$\therefore$  Number of possible outcomes = 18

Let there be x yellow marbles in the jar.

$\therefore$  Number of red marbles =  $18 - x$

$\Rightarrow$  Number of favourable outcomes =  $(18 - x)$

$\therefore$  Probability of drawing a red marble =  $(18 - x) / 18$

Now, according to the question,  $(18 - x) / 18 = 2/3$

$$\Rightarrow 3(18 - x) = 2 \times 18$$

$$\Rightarrow 54 - 3x = 36$$

$$\Rightarrow 3x = 18$$

$$\Rightarrow x = 6$$

So, number of yellow marbles in jar = 6

**Q25: A die is thrown twice. What is the probability that**

**(i) 5 will come up at least once, and**

**(ii) 5 will not come up either time? (2020)**



**Ans:** Since, throwing a die twice or throwing two dice simultaneously are same.

Possible outcomes 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),  
(6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)}

(i) Let N be the event that 5 will come up at least once, then the number of favourable

outcomes

$$= 5 + 6$$

$$= 11$$

$$\therefore P(N) = \frac{11}{36}$$

(ii) Let E be the event that 5 does not come up either time, then number of favourable

outcomes

$$= [36 - (5 + 6)]$$

$$= 25$$

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

**Q26:** If a number  $x$  is chosen at random from the numbers -3, -2, -1, 0, 1, 2, 3. What is the probability that  $x^2 \leq 4$ ? (2020)

**Ans:** Total number of outcomes = {-3, -2, -1, 0, 1, 2, 3} i.e. 7.

$\therefore$  Number of favourable outcomes = {4, 1, 0, 1, 4} i.e., 5.

$\therefore$  Required Probability =  $5/7$

**Q27:** Two dice are thrown simultaneously. What is the probability that the product of the numbers appearing on the top is 1? (CBSE 2020)

**Ans:** Total number of possible outcomes = 36

Only one outcome, i.e., (1, 1) has the product of the two numbers as 1.

So, the required probability is  $1/36$ .

**Q28:** A Group Housing Society has 600 members, who have their houses in the campus and decided to hold a Tree Plantation Drive on the occasion of New Year. Each household was given the choice of planting a saplings of its choice. The number of different types of saplings planted were:

(1) Neem - 125

(2) Peepal - 165

(3) Creepers - 50

(4) Fruit plants - 150

(5) Flowering plants - 110

On the opening ceremony, one of the plants is selected randomly for a prize. After reading the above passage, answer the following questions.

What is the probability that the selected plant is:

(A) a fruit plant or a flowering plant?

(B) either a Neem plant or a Peepal plant? (CBSE 2020)

**Ans: (A)** Of the 600 plants, there are 150 fruit plants and 110 flowering plants.

So, required probability

$$= \frac{(150 + 110)}{600} = \frac{260}{600} \text{ i.e., } \frac{13}{30}$$

**(B)** Of the 600 plants, there are 290 (125 + 165) plants which are either neem plants or peepal plants.

So, required probability =  $290/600$  i.e.,  $29/60$

**Q29: If a number  $x$  is chosen at random from the numbers  $-3, -2, -1, 0, 1, 2, 3$ . What is the probability that  $x^2 < 4$ ? (CBSE 2020)**

**Ans:** All possible outcomes are  $-3, -2, -1, 0, 1, 2, 3$

Favourable outcomes are  $-1, 0, 1$  (As  $x^2 < 4$ )

So, required probability =  $3/7$

**Q30: Find the probability that a leap year selected at random will contain 53 Sundays and 53 Mondays. (CBSE 2020)**

**Ans:** A leap year has 52 complete weeks + 2 days.

These two days may be

(Sun, Mon), (Mon, Tue), (Tue, Wed), (Wed, Thu), (Thu, Fri), (Fri, Sat) and (Sat, Sun).

Of the 7 possible outcomes, only 1

i.e., (Sun, Mon) is the favourable outcome.

So, required probability is  $1/7$

**Q31: A game in a booth at a Diwali fair involves using a spinner first. Then, if the spinner stops on an even number, the player is allowed to pick a marble from a bag. The spinner and the marbles in the bag are represented in the figure. Prizes are given when a black marble is picked. Shweta plays the game once.**



**(A) What is the probability that she will be allowed to pick a marble from the bag?**

**(B) Suppose she is allowed to pick a marble from the bag, what is the probability of getting a prize, when it is given that the bag contains 20 marbles out of which 6 are black? (CBSE 2020)**

**Ans: (A)** Shweta will be allowed to pick up a marble, only when the spinner stops on an even number.

$P(\text{getting an even number}) = 5/8$

Hence, the probability that she will be allowed to pick a marble from the bag is  $5/8$

**(B)**  $P(\text{getting a black marble}) = 6/20$ , or  $3/10$ .

$\therefore$  Probability of getting a prize is  $3/10$ .