

PROBABILITY

1. A box contains 20 balls bearing numbers 1, 2, 3, 4,.....20. A ball is drawn at random from the box. What is the probability that the number on the ball is. (CBSE 2005-06, 4 marks)
 (A) an odd number
 (B) divisible by 2 or 3
 (C) prime number
 (D) Not divisible by 10

2. An unbiased die is tossed once. Find the probability of getting
 (i) a multiple of 2 or 3.
 (ii) a prime number greater than 2. (CBSE 2006-07, 2 marks)

3. From a pack of 52 cards, red face cards are removed. After that a card is drawn at random from the pack. Find the probability that the card drawn is
 (i) a queen
 (ii) a red card
 (iii) a spade card (CBSE 2006-07, 3 marks)

4. A die is thrown once. Find the probability of getting a number less than 3. (CBSE 2007-08, 1 mark)

5. A pair of dice is thrown once. Find the probability of getting the same number on each dice. (CBSE 2007-08, 2 marks)

6. 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. (CBSE 2008-09, 3 marks)

7. In a throw of a pair of dice, the probability of getting a double is: (CBSE 2011-12, 1 mark)
 (A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{1}{6}$ (D) $\frac{5}{12}$

8. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is thrice that of the red ball. Find the number of blue balls in the bag. (CBSE 2011-12, 2 marks)

9. There are 30 cards of the same size in bag in which the 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. (CBSE 2011-12, 2 marks)

10. Three unbiased coins are tossed together. Find the probability of getting.
 (i) at least two heads
 (ii) at most two heads (CBSE 2011-12, 3 marks)

11. The probability of getting an even number, when a die is thrown once, is: (CBSE 2012-13, 1 mark)
 (A) $\frac{1}{2}$ (B) $\frac{1}{6}$ (C) $\frac{1}{3}$ (D) $\frac{5}{6}$

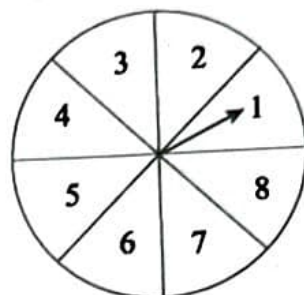
12. A box contains 90 discs, numbered from 1 to 90. If one disc is drawn at random from the box, the probability that it bears a prime number less than 23, is: (CBSE 2012-13, 1 mark)
 (A) $\frac{7}{20}$ (B) $\frac{4}{45}$ (C) $\frac{10}{90}$ (D) $\frac{9}{89}$

13. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability that the drawn card is neither a king nor a queen. (CBSE 2012-13, 2 marks)
14. A group consists of 12 persons, of which 3 are externally 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 values you prefer more. (CBSE 2012-13, 4 marks)
15. Mini scored 150 marks in a test getting 3 marks for each correct answer and losing 2 marks for each wrong answer. Had 4 marks been awarded for each correct answer and 1 marks been deducted for each incorrect answer, then she would have scored 250 marks. How many questions were there in the test, if she attempted all the questions? (CBSE 2013-14, 4 marks)
16. A letter of English alphabet is chosen at random. Determine the probability that the chosen letter is a consonant. (CBSE 2014-15, 1 mark)
17. Two different dice are rolled together. Find the probability of getting:
(i) the sum of numbers on two dice to be 5.
(ii) even numbers on both dice. (CBSE 2014-15, 3 marks)
18. Three distinct coins are tossed together. Find the probability of getting
(i) at least 2 heads
(ii) at most 2 heads (CBSE 2014-15, 3 marks)
19. All red faces are removed from a pack of playing cards. The remaining cards were 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
(iii) a card of clubs (CBSE 2014-15, 3 marks)
20. A box contains 20 cards numbered from 1 to 20. A card is drawn at random from the box. Find the probability that the number on the drawn card is
(i) divisible by 2 or 3
(ii) a prime number (CBSE 2014-15, 4 marks)
21. A bag contains 25 cards numbered from 1 to 25. A card is drawn at random from the bag. Find the probability that the number on the drawn card is:
(i) divisible by 3 or 5
(ii) a perfect square number (CBSE 2014-15, 4 marks)
22. Cards marked with number 3, 4, 5, ..., 50 are placed in a box and mixed through. A card is drawn at random from the box. Find the probability that the selected card bears a perfect square number. (CBSE 2015-16, 1 mark)
23. In a single throw of a pair of different dice, what is the probability of getting (i) a prime number on each dice? (ii) a total of 9 or 11? (CBSE 2015-16, 3 marks)
24. Two different dice are thrown together. Find the probability of:
(i) getting a number greater than 3 on each die.
(ii) getting a total of 6 or 7 of the numbers on two dice. (CBSE 2015-16, 3 marks)

25. A box consists of 100 shirts of which 88 are good, 8 have minor defects and 4 have major defects. Ramesh, a shopkeeper will buy only those shirts which are good but 'Kewal' another shopkeeper will not buy shirts with major defects. A shirt is taken out of the box at random. What is the probability that
(i) Ramesh will buy the selected shirt?
(ii) 'Kewal' will buy the selected shirt?

(CBSE 2015-16, 3 marks)

26. A game of chance consists of spinning an arrow on a circular board, divided into 8 equal parts, which comes to rest pointing at one of the numbers 1, 2, 3, ..., 8 (figure), which are equally likely outcomes. What is the probability that the arrow will point at (i) an odd number (ii) a number greater than 3 (iii) a number less than 9.



(CBSE 2015-16, 4 marks)

27. A number is chosen at random from the number $-3, -2, -1, 0, 1, 2, 3$. What will be the probability that square of this number is less than or equal to 1.

(CBSE 2016-17, 1 mark)

28. Two different dice are thrown together. Find the probability that the numbers obtained

- (i) have a sum less than 7
(ii) have a product less than 16
(iii) is a doublet of odd numbers.

(CBSE 2016-17, 3 marks)

29. Peter throws two different dice together and finds the product of the two numbers obtained. Rina throws a die and squares the number obtained. Who has the better chance to get the number 25.

(CBSE 2016-17, 4 marks)

30. Two different dice are tossed together. Find the probability:

- (i) of getting a doublet
(ii) of getting a sum 10, of the number on the two dice.

(CBSE 2017-18, 2 marks)

31. An integer is chosen at random between 1 and 100. Find the probability that it is:

- (i) divisible by 8
(ii) not divisible by 8

(CBSE 2017-18, 2 marks)

32. A game consists of tossing a coin 3 times and noting the outcome each time. If getting the same result in all the tosses is a success, find the probability of losing the game.

(CBSE 2018-19, 2 marks)

33. A die is thrown once. Find the probability of getting a number which (i) is a prime number (ii) lies between 2 and 6.

(CBSE 2018-19, 2 marks)

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

(CBSE 2019-20, 1 mark)

35. A die is thrown once. What is the probability of getting a number less than 3?

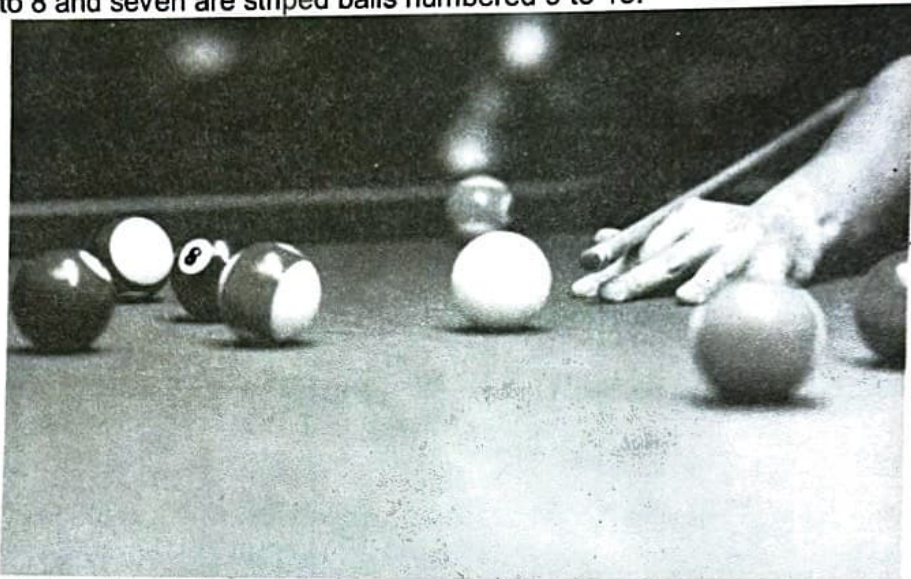
(CBSE 2019-20, 1 mark)

36. If the probability of winning a game is 0.07, what is the probability of losing it?

(CBSE 2019-20, 1 mark)

57. From the data 1, 4, 7, 9, 16, 21, 25, if all the even numbers are removed, then the probability of getting at random a prime number from the remaining is: **(CBSE 2023-24, 1 Mark)**
- (A) $\frac{2}{5}$ (B) $\frac{1}{5}$
(C) $\frac{1}{7}$ (D) $\frac{2}{7}$
58. Two dice are rolled together, the probability of getting sum of numbers on the two dice as 2, 3 or 5, is: **(CBSE 2023-24, 1 Mark)**
- (A) $\frac{7}{36}$ (B) $\frac{11}{36}$
(C) $\frac{5}{36}$ (D) $\frac{4}{9}$
59. Two dice are rolled together. The probability of getting the sum of the two numbers to be more than 10 is _____. **(CBSE 2023-24, 1 Mark)**
- (A) $\frac{1}{9}$ (B) $\frac{1}{6}$
(C) $\frac{7}{12}$ (D) $\frac{1}{12}$
60. A box contains cards numbered 6 to 55. A card is drawn at random from the box. The probability that the drawn card has a number which is a perfect square is: **(CBSE 2023-24, 1 Mark)**
- (A) $\frac{7}{50}$ (B) $\frac{7}{55}$
(C) $\frac{1}{10}$ (D) $\frac{5}{49}$
61. Two dice are thrown together. The probability that they show different numbers is: **(CBSE 2023-24, 1 Mark)**
- (A) $\frac{1}{6}$ (B) $\frac{5}{6}$
(C) $\frac{1}{3}$ (D) $\frac{2}{3}$
62. The probability of guessing the correct answer to a certain test question is $\frac{x}{6}$. If the probability of not guessing the correct answer to this question is $\frac{2}{3}$, then the value of x is: **(CBSE 2023-24, 1 Mark)**
- (A) 2 (B) 3
(C) 4 (D) 5
63. If a digit is chosen at random from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9; then the probability that this digit is an odd prime number is: **(CBSE 2023-24, 1 Mark)**
- (A) $\frac{1}{3}$ (B) $\frac{2}{3}$
(C) $\frac{4}{9}$ (D) $\frac{5}{9}$

52. **Assertion (A):** The probability of getting a prime number, when a die is thrown once, is $\frac{2}{3}$.
Reason (R): On the faces of a die, prime numbers are 2, 3, 5.
- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
 (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
 (C) Assertion (A) is true, but Reason (R) is false.
 (D) Assertion (A) is false, but Reason (R) is true. (CBSE 2022-23, 1 mark)
53. A bag contains 4 red, 3 blue and 2 yellow balls. One ball is drawn at random from the bag. Find the probability that drawn ball is:
 (i) red, (ii) yellow. (CBSE 2022-23, 2 marks)
54. A box contains 90 discs, numbered from 1 to 90. If one disc is drawn at random, then find the probability that it bears a multiple of 15. (CBSE 2022-23, 2 marks)
55. "Eight Ball" is a game played on a pool table with 15 balls numbered 1 to 15 and a "cue ball" that is solid and white. Of the 15 numbered balls, eight are solid (non-white) coloured and numbered 1 to 8 and seven are striped balls numbered 9 to 15.



The 15 numbered pool balls (no cue ball) are placed in a large bowl and mixed, then one ball is drawn out at random.

Based on the above information, answer the following question:

- (i) What is the probability that the drawn ball bears number 8?
 (ii) What is probability that the drawn ball bears an even number?

OR

What is the probability that the drawn ball bears a number, which is a multiple of 3?

- (iii) What is the probability that the drawn ball is a solid coloured and bears an even number?

(CBSE 2022-23, 4 marks)

56. If the probability of a player winning a game is 0.79, then the probability of his losing the same game is:
 (A) 1.79 (B) 0.31
 (C) 0.21% (D) 0.21
- (CBSE 2023-24, 1 Mark)

45. Probability of happening of an event is denoted by p and probability of non-happening of the event is denoted by q . Relation between p and q is _____. (CBSE 2022-23, 1 mark)
 (A) $p + q = 1$ (B) $p = 1, q = 1$
 (C) $p = q - 1$ (D) $p + q + 1 = 0$
46. 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? (CBSE 2022-23, 1 mark)
 (A) 40 (B) 240
 (C) 480 (D) 750
47. Two dice are thrown together. The probability of getting the difference of numbers on their upper faces equals to 3 is: (CBSE 2022-23, 1 mark)
 (A) $\frac{1}{9}$ (B) $\frac{2}{9}$
 (C) $\frac{1}{6}$ (D) $\frac{1}{12}$
48. 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: (CBSE 2022-23, 1 mark)
 (A) $\frac{1}{13}$ (B) $\frac{9}{13}$
 (C) $\frac{4}{13}$ (D) $\frac{12}{13}$
49. Two coins are tossed together. The probability of getting atmost two heads is: (CBSE 2022-23, 1 mark)
 (A) $\frac{1}{2}$ (B) $\frac{1}{4}$
 (C) $\frac{3}{4}$ (D) 1
50. Which of the following numbers cannot be the probability of an event? (CBSE 2022-23, 1 mark)
 (A) 0.5 (B) 5%
 (C) $\frac{1}{0.5}$ (D) $\frac{0.5}{14}$
51. **Assertion (A):** The probability that a leap year has 53 Sundays is $\frac{2}{7}$.
Reason (R): The probability that a non-leap year has 53 Sundays is $\frac{5}{7}$.
 (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. 19.

(CBSE 2022-23, 1 mark)

37. If a number x is chosen at random from the numbers $-3, -2, -1, 0, 1, 2, 3$. What is the probability that $x^2 \leq 4$? (CBSE 2019-20, 2 marks)
38. For an event $P(E) + P(\bar{E}) = x$, then the value of $x^3 - 3$ is (CBSE 2021-22, TERM-I, 1 mark)
(A) -2 (B) 2
(C) 1 (D) -1
39. The probability that the drawn card from a pack of 52 cards is neither an ace nor spade is (CBSE 2021-22, TERM-I, 1 mark)
(A) $\frac{9}{13}$ (B) $\frac{35}{52}$
(C) $\frac{10}{13}$ (D) $\frac{19}{26}$
40. Which of the following cannot be the probability of an event? (CBSE 2021-22, TERM-I, 1 mark)
(A) 0.01 (B) 3%
(C) $\frac{16}{17}$ (D) $\frac{17}{16}$
41. A dice is rolled twice. The probability that 5 will not come up either time is (CBSE 2021-22, TERM-I, 1 mark)
(A) $\frac{11}{36}$ (B) $\frac{1}{3}$
(C) $\frac{13}{26}$ (D) $\frac{25}{36}$
42. A bag contains 5 pink, 8 blue and 7 yellow balls. One ball is drawn at random from the bag. What is the probability of getting neither a blue nor a pink ball? (CBSE 2022-23, 1 mark)
(A) $\frac{1}{4}$ (B) $\frac{2}{5}$
(C) $\frac{7}{20}$ (D) $\frac{13}{20}$
43. A card is drawn at random from a well shuffled deck of 52 playing cards. The probability of getting a face card is: (CBSE 2022-23, 1 mark)
(A) $\frac{1}{2}$ (B) $\frac{3}{13}$
(C) $\frac{4}{13}$ (D) $\frac{1}{13}$
44. 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 _____. (CBSE 2022-23, 1 mark)
(A) $\frac{3}{4}$ (B) $\frac{1}{3}$
(C) 1 (D) $\frac{1}{4}$

64. Two dice are tossed simultaneously. The probability of getting odd numbers on both the dice is: (CBSE 2023-24, 1 Mark)

(A) $\frac{6}{36}$ (B) $\frac{3}{36}$
(C) $\frac{12}{36}$ (D) $\frac{9}{36}$

65. For an event E, if $P(E) + P(\bar{E}) = q$, then the value of $q^2 - 4$ is: (CBSE 2023-24, 1 Mark)

(A) -3 (B) 3
(C) 5 (D) -5

66. One ticket is drawn at random from a bag containing tickets numbered 1 to 40. The probability that the selected ticket has a number which is a multiple of 7 is: (CBSE 2023-24, 1 Mark)

(A) $\frac{1}{7}$ (B) $\frac{1}{8}$
(C) $\frac{1}{5}$ (D) $\frac{7}{40}$

Direction:

In Q. No 67 is Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labeled as Assertion (A) and the other is labeled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below:

- (A) Both, Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).
(B) Both, Assertion (A) and Reason (R) are true and Reason (R) is not 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.

(CBSE 2023-24, 1 Mark)

67. 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): $P(E) + P(\text{not } E) = 1$

68. In a pack of 52 playing cards one card is lost. From the remaining cards, a card is drawn at random. Find the probability that the drawn card is queen of heart, if the lost card is a black card. (CBSE 2023-24, 2 Marks)

69. A carton consists of 60 shirts of which 48 are good, 8 have major defects and 4 have minor defects. Nigam, a trader, will accept the shirts which are good but Anmol, another trader, will only reject the shirts which have major defects. One shirt is drawn at random from the carton. Find the probability that it is acceptable to Anmol. (CBSE 2023-24, 2 Marks)

70. One card is drawn at random from a well shuffled deck of 52 cards. Find the probability that the card drawn
(i) is queen of hearts
(ii) is not a jack (CBSE 2023-24, 2 Marks)

71. Three unbiased coins are tossed simultaneously. Find the probability of getting:
(i) at least one head?
(ii) exactly one tails.
(iii) at heads and one tail (CBSE 2023-24, 3 Marks)

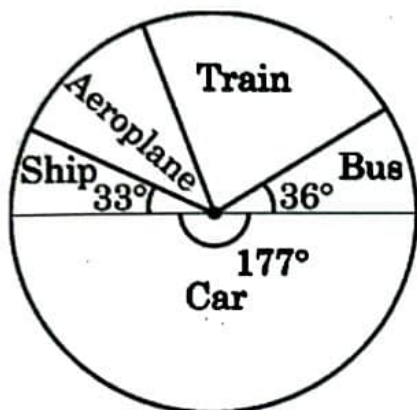
72. (a) Three coins are tossed simultaneously. What is the probability of getting:
(CBSE 2023-24, 3 Marks)
- (i) at least one head?
 - (ii) exactly two tails?
 - (iii) at most one tail?

OR

- (b) A box contains 90 discs which are numbered 1 to 90. If one disc is drawn at random from the box, find the probability that it bears a:
- (i) 2-digit number less than 40.
 - (ii) number divisible by 5 and greater than 50.
 - (iii) a perfect square number.

Case Study

73. In a survey on holidays, 120 people were asked to state which type of transport they used on their last holiday. The following pie chart shows the results of the survey.
(CBSE 2023-24, 4 Marks)



Observe the pie chart and answer the following questions:

- (i) If one person is selected at random, find the probability that he/she traveled by bus or ship.
- (ii) Which is most favourite mode of transport and how many people used it?
- (iii) (a) A person is selected at random. If the probability that he did not use train is $\frac{4}{5}$, find the number of people who used train.

OR

- (b) The probability that randomly selected person used aeroplane is $\frac{7}{60}$. Find the revenue collected by Air Company at the rate of Rs. 5000 per person.