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CLASS X · MATHEMATICS STANDARD (041) · CBSE BOARD EXAMINATION 2027

CHAPTER 14

Probability

Chapter Practice Booklet · Questions only · Answers in the separate Answer Booklet

91 practice questions | 4 case studies | 2024–2026 board question index | Original diagrams

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STUDENT DETAILS

NAME _____

CLASS & SECTION _____

ROLL NO. _____

BOOKLET STARTED ON _____

CHAPTER TEST SCORE _____ / 20

1 Chapter Notes

READ THIS FIRST

The whole chapter in short-note form: every definition, rule, counting method and model answer. Revise from here – you should not need the textbook again.

1 Words you must know

- **Experiment:** an action whose results can be listed, e.g. tossing a coin, throwing a die, drawing a card.
- **Random experiment:** we know all the possible results but cannot say in advance which one will happen.
- **Outcome:** one possible result. **Sample space:** the list of *all* outcomes. For one die: 1, 2, 3, 4, 5, 6.
- **Event:** a collection of outcomes we are interested in, e.g. "getting an even number" = {2, 4, 6}.
- **Elementary event:** an event with exactly one outcome, e.g. "getting a 5".

Equally likely outcomes: every outcome has the same chance. Words that tell you this: *fair, unbiased, well-shuffled, at random, identical, without looking*.

2 Theoretical (classical) probability

$$P(E) = \frac{\text{Number of outcomes favourable to } E}{\text{Total number of possible outcomes}}$$

This formula works only when all outcomes are **equally likely**.

1. Write the **total** number of outcomes (list them if needed).
2. List the **favourable** outcomes and count them.
3. Divide and write the fraction in **lowest terms**.

EXAMPLE

A die is thrown once. E: a number greater than 4.

Total = 6; Favourable: 5, 6 → 2; $P(E) = \frac{2}{6} = \frac{1}{3}$

Class IX "experimental probability" (based on repeated trials) is not asked in Class X. Use the formula above.

3 Rules every answer must obey

- $0 \le P(E) \le 1$ for every event. A probability can be written as a fraction, decimal or percentage.
- **Can never be a probability:** a negative number (-0.3), a number above 1 (1.2, $\frac{7}{5}$, $\frac{1}{0.99}$), a percentage above 100% (115%).
- **Sure (certain) event:** $P = 1$, e.g. a number less than 7 on a die. **Impossible event:** $P = 0$, e.g. getting 8 on a die.

Complementary event "not E" (written $\bar{E}$): $P(E) + P(\text{not } E) = 1$, so $P(\text{not } E) = 1 - P(E)$

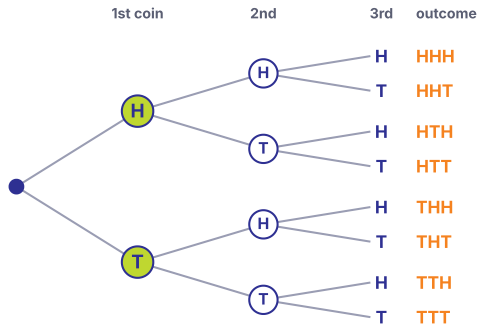
- The probabilities of all the elementary events of an experiment add up to 1. Coin: $P(H) + P(T) = \frac{1}{2} + \frac{1}{2} = 1$.
- If $P(\text{win}) = 0.79$, then $P(\text{lose}) = 0.21$. If $P(E) = p$, then $P(\text{not } E) = 1 - p$.
- **Careful:** "less than 3" and "more than 3" on a die are **not** complementary – the number 3 is in neither.

4 Decode the question words

at least one	one or more. Often easier: $1 - P(\text{none})$.
at most one	zero or one (not more than one).
exactly two	two, and no more.
not E	everything except E: $1 - P(E)$.
A or B	in A, in B, or in both. Count shared outcomes once.
A and B / both	must satisfy both conditions, e.g. a red king.
neither A nor B	in none of them: total – (A or B).
more than / less than	the number itself is **not** included.

5 Tossing coins

- **One coin:** H, T → 2 outcomes.
- **Two coins** (or one coin twice): HH, HT, TH, TT → 4 outcomes. HT and TH are **different** outcomes.
- **Three coins:** $2 \times 2 \times 2 = 8$ outcomes, shown in the tree below.



Two coins: exactly one head	HT, TH → $\frac{2}{4} = \frac{1}{2}$
Two coins: at least one head	HH, HT, TH → $\frac{3}{4}$
Three coins: exactly two heads	HHT, HTH, THH → $\frac{3}{8}$
Three coins: at least one head	all except TTT → $\frac{7}{8}$

6 Throwing one die

Faces 1, 2, 3, 4, 5, 6 → 6 equally likely outcomes.

Even (2, 4, 6) or odd (1, 3, 5)	$\frac{3}{6} = \frac{1}{2}$ each
Prime: 2, 3, 5	$\frac{1}{2}$
Composite: 4, 6	$\frac{2}{6} = \frac{1}{3}$
Neither prime nor composite: 1	$\frac{1}{6}$
Factor of 6: 1, 2, 3, 6	$\frac{4}{6} = \frac{2}{3}$
Perfect square: 1, 4	$\frac{2}{6} = \frac{1}{3}$
Number other than 3	$1 - \frac{1}{6} = \frac{5}{6}$

"Between 2 and 6" means 3, 4, 5 only (the end numbers are not included).

7 Two dice (or one die thrown twice)

Total outcomes $= 6 \times 6 = 36$, written as ordered pairs (first die, second die). (2, 5) and (5, 2) are different.

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Cell = **sum** · green: doublets · orange: sum 7

Sum	2	3	4	5	6	7	8	9	10	11	12
No. of ways	1	2	3	4	5	6	5	4	3	2	1

- **Doublets** (same number on both): 6 → $\frac{1}{6}$. Different numbers: 30 → $\frac{5}{6}$.
- Sum 7 is the most likely sum (6 ways). Sum 2 and sum 12: 1 way each. Sum 13 or 1: impossible.
- Sum is prime (2, 3, 5, 7, 11): $1 + 2 + 4 + 6 + 2 = 15 \rightarrow \frac{15}{36} = \frac{5}{12}$.
- Both numbers less than 4: $3 \times 3 = 9 \rightarrow \frac{1}{4}$. At least one 6: $36 - 25 = 11 \rightarrow \frac{11}{36}$.

8 A pack of 52 playing cards

♠ Spades (black)	A	2	3	4	5	6	7	8	9	10	J	Q	K
♣ Clubs (black)	A	2	3	4	5	6	7	8	9	10	J	Q	K
♥ Hearts (red)	A	2	3	4	5	6	7	8	9	10	J	Q	K
♦ Diamonds (red)	A	2	3	4	5	6	7	8	9	10	J	Q	K

Suits (13 cards each)	4
Red / black cards	26 / 26
Face cards J, Q, K (green)	12
Red / black face cards	6 / 6
Aces (grey) – not face cards	4
Number cards 2 to 10	36
Kings, queens, jacks	4 each
Cards of one rank, e.g. all the 7s	4

- An **ace is not a face card**. Face cards are also called picture or court cards.
- **Cards removed:** first find how many cards are **left** (new total), then count favourable cards among those left.

EXAMPLE

All 4 aces are removed. Cards left = 48.

$P(\text{red card}) = \frac{24}{48} = \frac{1}{2}$, since 2 red aces have gone.

9 Bags, balls and an unknown number

- $P(\text{a colour}) = \dfrac{\text{balls of that colour}}{\text{total balls}}$. The probabilities of all colours add up to 1.
- If some balls are added or taken out, **the total changes** – write a new fraction.
- For an unknown, call it x, write P in terms of x, form an equation and solve.

EXAMPLE

A bag has 8 red balls and x blue balls. $P(\text{blue}) = 3 \times P(\text{red})$.
$\dfrac{x}{8+x} = 3 \times \dfrac{8}{8+x} \Rightarrow x = 24$. Total $= 32$, $P(\text{red}) = \dfrac{8}{32} = \dfrac{1}{4}$.

EXAMPLE

Total balls 40, $P(\text{green}) = \dfrac{3}{8} \rightarrow$ green balls $= \dfrac{3}{8} \times 40 = 15$.

10 Numbered cards, tickets and discs

- Numbers from a to b (both included): count $= b - a + 1$. Cards 5 to 100 → 96 cards.
- Multiples of k from 1 to n: the whole-number part of $n \div k$. Multiples of 7 up to 100: 14.
- "Between 10 and 20" leaves out 10 and 20. "From 10 to 20" includes them.
- For "a multiple of 3 **or** 5", list both and count numbers like 15 only once.

Primes up to 10 / 20 / 30 / 50 / 100	4 / 8 / 10 / 15 / 25
Perfect squares 1 to 100	1, 4, 9, …, 100 → 10
Perfect cubes 1 to 100	1, 8, 27, 64 → 4
Two-digit numbers	10 to 99 → 90

Primes up to 100: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97. 1 is not prime.

11 Calendar and letters of a word

53 Sundays? A non-leap year has 365 days = 52 weeks + **1** extra day. The extra day can be any of 7 days → $P = \dfrac{1}{7}$.
A leap year has 366 days = 52 weeks + **2** extra days. The 2 days form one of 7 pairs: (Sun, Mon), (Mon, Tue), …, (Sat, Sun). Two pairs contain Sunday → $P = \dfrac{2}{7}$.

- **Letters:** count every letter, including repeats. PROBABILITY has 11 letters: B and I appear twice.
- Vowels are A, E, I, O, U. The English alphabet has 26 letters: 5 vowels and 21 consonants.
- A week has 7 days, a year 12 months.

12 Defective items, lotteries, surveys and spinners

- **Defective items:** read whether the defective ones are *part of* the total or *mixed with* it. "12 bad eggs mixed with 132 good" → total 144.
- **Lottery / lucky draw:** $P(\text{prize}) = \dfrac{\text{prize tickets}}{\text{total tickets}}$.
- **Survey data:** when one person is chosen at random from a table or chart, $P = \dfrac{\text{people in that group}}{\text{total people}}$.
- **Spinner:** if the arrow can stop at each equal sector with the same chance, each number is one outcome.
- **Fair game:** each player has the same chance of winning.

13 Model answer: two dice (3 marks)

Two dice are thrown together. Find P(sum is 9) and P(doublet).

1. Total number of outcomes $= 6 \times 6 = 36$. ½
2. Sum 9: (3, 6), (4, 5), (5, 4), (6, 3) → 4 outcomes. ½
3. $P(\text{sum } 9) = \dfrac{4}{36} = \dfrac{1}{9}$. 1
4. Doublets: (1, 1), (2, 2), …, (6, 6) → 6. $P = \dfrac{6}{36} = \dfrac{1}{6}$. 1

Always **list** the favourable pairs. A bare answer like "$\frac{1}{9}$" can lose the step marks.

14 **Model answer: cards removed (3 marks)**

All the red face cards are removed from a pack of 52. One card is drawn. Find P(face card), P(red card) and P(black king).

1. Red face cards $= 6$, so cards left $= 52 - 6 = 46$. ½
2. Face cards left $= 12 - 6 = 6$: $P = \frac{6}{46} = \frac{3}{23}$. 1
3. Red cards left $= 26 - 6 = 20$: $P = \frac{20}{46} = \frac{10}{23}$. 1
4. Black kings $= 2$: $P = \frac{2}{46} = \frac{1}{23}$. ½

Exam snapshot

What the board asks, and how to prepare

SYLLABUS 2026–27

- Classical (theoretical) definition of probability.
- Simple problems on finding the probability of an event: coins, dice, playing cards, balls, numbered cards, letters, calendar, data.

Not asked: experimental probability from trials, and formulas from Class XI–XII. Count outcomes by listing them.

BOARD WEIGHTAGE

11 / 80

Unit VII Statistics & Probability together. Probability alone gave 4–6 marks in every paper checked: two or three 1-mark questions (often one assertion–reason) plus a 2- or 3-mark question, sometimes a case-study part.

MOST ASKED IN BOARD PAPERS, 2024–2026 + SAMPLE PAPER 2026–27 (8 PAPERS CHECKED)

How often	Question type	Marks	Papers
★★★	Two dice: sum, product, difference, doublet, same / different numbers	1–3	7 of 8
★★★	Numbered cards, tickets or discs from a range: squares, cubes, primes, multiples, two-digit numbers	1–2	5 of 8
★★★	Rules: $P(\text{not } E) = 1 - P(E)$, sure and impossible events, values that cannot be a probability (often assertion–reason)	1	5 of 8
★★☆	Cards from a pack of 52, including packs with some cards missing	1–2	4 of 8
★☆☆	Data or case-study based (survey chart, balls faced by a batsman)	1–4	2 of 8
★☆☆	Coins (two or three)	1	1 of 8
★☆☆	53 Sundays / Mondays in a year	1	1 of 8

MISTAKES THAT COST MARKS

- Two coins: taking HT and TH as one outcome. There are **4** outcomes, not 3.
- Two dice: using the 11 sums as outcomes. There are **36** ordered pairs.
- Forgetting the **new total** when cards or balls are removed or added.
- Counting an ace as a face card, or 1 as a prime.
- Counting the end numbers in "between 2 and 6". It means 3, 4, 5 only.
- Not reducing the fraction, or giving an answer above 1. Check: $0 \le P \le 1$.

HOW TO USE THIS BOOKLET

1. **Day 1:** Notes, then Part A (NCERT) and Part B (Exemplar). Do every MUST DO question first.
2. **Day 2:** Part C (board pattern) and Part D (case studies).
3. **Day 3:** Part E (challenge) and the real board questions in Part F.
4. **Wed 2 Dec:** zero-period chapter test – 20 marks in 40 minutes, without the booklet.
5. Check every answer in the Answer Booklet. Write each mistake on the My Mistakes page.

SAMPLE SPACES AT A GLANCE

One coin	2	Two coins	4
Three coins	8	One die	6
Two dice / die twice	36	Pack of cards	52
Days of a week	7	English alphabet	26
Months of a year	12	Numbers a to b	$b-a+1$

PART A · NCERT PRACTICE

A NCERT Practice

The same skills as the NCERT examples and exercise, with new numbers. Finish every question before moving on.

Basic ideas and rules

A1. Fill in the blanks: MUST DO [5]

(i) The probability of an event that is certain to happen is ____. Such an event is called a ____ event.

(ii) The probability of an event that cannot happen is ____. Such an event is called an ____ event.

(iii) $P(E) + P(\text{not } E) =$ ____.

(iv) The sum of the probabilities of all the elementary events of an experiment is ____.

(v) The probability of any event is greater than or equal to ____ and less than or equal to ____.

A2. Which of these experiments have equally likely outcomes? Give a reason in each case. [2]

(i) A school team plays a football match. Result: it wins or it loses.

(ii) A fair coin is tossed. Result: head or tail.

(iii) A student who has not studied guesses the answer to a true–false question. Result: right or wrong.

(iv) A bus is expected at 8 a.m. Result: it arrives on time or it is late.

A3. Why is tossing a coin taken as a fair way of deciding which team bats first in a cricket match? [1]

A4. Which of the following cannot be the probability of an event? [1]

(a) $\frac{3}{5}$ (b) -0.4 (c) 18% (d) 0.9

A5. If $P(E) = 0.07$, what is the probability of "not E"? [1]

A6. A jar contains only mint-flavoured toffees. Ravi takes out one toffee without looking. Find the probability that it is: [2]

(i) orange-flavoured (ii) mint-flavoured

A7. The probability that two students chosen at random from a class do *not* have the same birthday is 0.994. What is the probability that they have the same birthday? [1]

Balls, coins, fish and other everyday situations

A8. A bag contains 4 red, 6 white and 5 green balls. One ball is taken out at random. Find the probability that it is: MUST DO [3]

(i) white (ii) not green (iii) neither red nor white

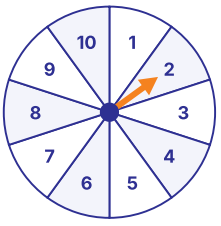
A9. A money box contains sixty ₹1 coins, forty ₹2 coins, twenty-five ₹5 coins and fifteen ₹10 coins. When the box is turned upside down, one coin falls out at random. Find the probability that the coin: [2]

(i) is a ₹5 coin (ii) is not a ₹10 coin

A10. A fish tank has 6 male fish and 9 female fish. One fish is taken out at random. What is the probability that it is a male fish? [1]

A11. In a game, an arrow is spun and comes to rest pointing at one of the numbers 1 to 10 (see the figure). All the outcomes are equally likely. Find the probability that it points at: MUST DO [3]

(i) an odd number
(ii) a number greater than 3
(iii) a prime number



A12. A die is thrown once. Find the probability of getting: MUST DO [3]

(i) a composite number
(ii) a number lying between 1 and 5
(iii) an even prime number

Playing cards

A13. One card is drawn from a well-shuffled pack of 52 cards. Find the probability of getting: [3]
MUST DO

(i) a black queen
(ii) a face card
(iii) a black face card
(iv) the 7 of clubs
(v) a heart
(vi) a card that is not an ace

A14. Six cards – the 9, 10, jack, queen, king and ace of hearts – are shuffled and placed face down. One card is picked at random. [3]

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

Defective items, discs, letters and lotteries

A15. 15 faulty bulbs have been mixed by mistake with 105 good ones. One bulb is taken out at random. Find the probability that it is good. [1]

A16. A carton of 25 eggs has 5 rotten eggs. [2]

(i) One egg is taken out at random. What is the probability that it is rotten?
(ii) The egg taken out in (i) is rotten and is not put back. One more egg is taken out. What is the probability that it is not rotten?

A17. A box contains 80 discs numbered 1 to 80. One disc is taken out at random. Find the probability that it bears: MUST DO [3]

(i) a two-digit number
(ii) a perfect square number
(iii) a number divisible by 6

A18. The six faces of a cube carry the letters P, Q, R, P, S, P. The cube is thrown once. Find the probability of getting: [2]

(i) the letter P (ii) the letter Q

A19. A school fair has 500 scratch cards: 5 win a bicycle, 25 win a book, 70 win a pen and the rest win nothing. One card is picked at random. Find the probability that it: [2]

(i) wins a book (ii) wins nothing

A20. A jar has 36 marbles. Some are red and the rest are yellow. The probability of drawing a red marble is $\frac{5}{9}$. How many yellow marbles are there? [2]

Coins and two dice

A21. Two dice, one red and one blue, are thrown at the same time. MUST DO [3]

(i) How many outcomes are possible?

(ii) Find the probability of each possible sum 2, 3, …, 12.

(iii) A student says: "There are 11 possible sums, so each has probability $\frac{1}{11}$." Do you agree? Give a reason.

A22. A coin is tossed three times. Meera wins if she gets exactly two heads; otherwise she loses. Find the probability that Meera wins and the probability that she loses. [2]

A23. A die is thrown twice. What is the probability that: [2]

(i) 3 will not come up either time

(ii) 3 will come up at least once

A24. When two coins are tossed, Rahul says: "The probability of getting one head and one tail is $\frac{1}{3}$, because the three possible results are two heads, two tails, or one of each." Is he right? Give a reason. [2]

B

PART B · EXEMPLAR PRACTICE

Exemplar Practice

Exemplar-style questions on the same ideas, one step harder. Give a reason for every 2-mark answer.

Multiple choice

1 mark each

B1. Which of the following can be the probability of an event? [1]

(a) $\frac{18}{23}$ (b) 1.0001 (c) -0.5 (d) $\frac{7}{5}$

B2. A letter is chosen at random from the letters of the word MISSISSIPPI. The probability that it is a consonant is: [1]

(a) $\frac{4}{11}$ (b) $\frac{7}{11}$ (c) $\frac{3}{11}$ (d) $\frac{5}{11}$

B3. A card is drawn from a well-shuffled pack of 52 cards. The probability that it is neither a red card nor a queen is: [1]

(a) $\frac{7}{13}$ (b) $\frac{1}{2}$ (c) $\frac{6}{13}$ (d) $\frac{3}{13}$

B4. Someone is asked to choose a number from 1 to 100. The probability that it is a prime number is: [1]

(a) $\frac{1}{5}$ (b) $\frac{6}{25}$ (c) $\frac{13}{50}$ (d) $\frac{1}{4}$

B5. Two dice are thrown together. The probability that the sum of the numbers is a multiple of 5 is: [1]

(a) $\frac{1}{6}$ (b) $\frac{7}{36}$ (c) $\frac{1}{4}$ (d) $\frac{5}{36}$

B6. A ticket is drawn at random from tickets numbered 1 to 20. The probability that its number is a multiple of 3 or 7 is: [1]

(a) $\frac{3}{10}$ (b) $\frac{7}{20}$ (c) $\frac{2}{5}$ (d) $\frac{1}{2}$

B7. The probability that a girl wins the first prize in a lottery is 0.08. If 6000 tickets are sold, how many tickets has she bought? [1]

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

B8. A bag contains 3 red, 5 black and 7 white balls. A ball is drawn at random. The probability that it is not black is: [1]

(a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{7}{15}$ (d) $\frac{8}{15}$

B9. The probability that a non-leap year chosen at random has 53 Sundays is: [1]

(a) $\frac{2}{7}$ (b) $\frac{3}{7}$ (c) $\frac{5}{7}$ (d) $\frac{1}{7}$

B10. A number x is chosen at random from $-3, -2, -1, 0, 1, 2, 3$. The probability that $x^2 \leq 4$ is: [1]

(a) $\frac{3}{7}$ (b) $\frac{2}{7}$ (c) $\frac{5}{7}$ (d) $\frac{1}{7}$

Short answer with reasons

2 marks each

B11. Sara says: "The probability of a head is $\frac{1}{2}$, so if I toss a coin 10 times I will surely get exactly 5 heads." Is she right? Give a reason. [2]

B12. A die is thrown once. Is the probability of getting a number less than 3 equal to the probability of getting a number greater than 3? Give a reason. MUST DO [2]

B13. Two coins are tossed together. Is the probability of getting at least one head equal to the probability of getting at most one head? Justify. [2]

B14. A family has three children. Assuming a boy and a girl are equally likely, find the probability that the family has at least one girl. [2]

B15. A die is thrown once. Find the probability of getting a number which is: [2]

(i) a multiple of both 2 and 3

(ii) a number whose square is less than 20

Short answer

3 marks each

B16. Two dice are thrown at the same time. Find the probability that: MUST DO [3]

(i) the product of the numbers is 12

(ii) the difference of the numbers is 3

(iii) the number on the first die is greater than the number on the second

B17. A box contains cards bearing the odd numbers 3, 5, 7, 9, …, 35, one number on each card. A card is drawn at random. Find the probability that the number on it is: [3]

(i) a prime number (ii) divisible by 3 (iii) a perfect square

B18. A bag contains 24 balls: x are red, $2x$ are white and $3x$ are blue. A ball is drawn at random. Find the probability that it is: [3]

(i) not red (ii) white

C

PART C · BOARD PATTERN

Board Pattern Practice

Question types from real 2024–2026 board papers and the 2026–27 Sample Paper, grouped by type. ★★★ = asked in 5 or more of 8 papers · ★★ = 3–4 papers · ★ = 1–2 papers.

ASSERTION–REASON: HOW TO ANSWER

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

Two dice

★★★ 7 of 8 papers · 1–3 marks

C1. Two dice are thrown together. The probability of getting the same number on both dice is: [1]

(a) $\frac{1}{36}$ (b) $\frac{1}{6}$ (c) $\frac{1}{3}$ (d) $\frac{5}{6}$

C2. Two dice are thrown together. The probability that the sum of the numbers is 8 is: [1]

(a) $\frac{1}{6}$ (b) $\frac{5}{36}$ (c) $\frac{1}{9}$ (d) $\frac{7}{36}$

C3. Two dice are thrown together. The probability that the product of the numbers is odd is: [1]

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{3}{4}$ (d) $\frac{1}{4}$

C4. Two dice are thrown together. The probability that the sum of the numbers is less than 4 is: [1]

(a) $\frac{1}{12}$ (b) $\frac{1}{18}$ (c) $\frac{1}{9}$ (d) $\frac{1}{6}$

C5. Two dice are thrown together. The probability that both numbers are greater than 4 is: [1]

(a) $\frac{1}{3}$ (b) $\frac{2}{9}$ (c) $\frac{1}{9}$ (d) $\frac{1}{36}$

C6. ASSERTION–REASON [1]

Assertion (A): When two dice are thrown, the probability of getting a sum of 7 is $\frac{1}{6}$.

Reason (R): When two dice are thrown, there are 11 possible sums, from 2 to 12.

C7. Two dice are thrown at the same time. Find the probability that the product of the numbers is a perfect square. MUST DO [2]

C8. Two dice are thrown at the same time. Find the probability that the sum of the numbers is a perfect square. [2]

C9. Two dice of different colours are thrown together. Write the number of possible outcomes. Find the probability of getting: MUST DO [3]

(i) the same number on both dice
(ii) different numbers on the two dice
(iii) an odd sum

C10. Two dice are thrown at the same time. Find the probability that: [3]

(i) the sum is less than 5
(ii) the sum is a multiple of 4
(iii) a doublet of odd numbers appears

C11. A die is thrown twice. Find the probability that: [3]

(i) the first throw shows a prime number and the second an even number

(ii) at least one throw shows 6

(iii) the sum of the two numbers is 9 or 11

C12. Two dice are thrown together. Find the probability that the difference of the numbers on them is: MUST DO [3]

(i) 2 (ii) 0 (iii) at most 1

Numbered cards, tickets and discs

★★★ 5 of 8 papers · 1–2 marks

C13. A number is chosen at random from 1 to 50. The probability that it is a multiple of 4 is: [1]

(a) $\frac{1}{4}$ (b) $\frac{6}{25}$ (c) $\frac{13}{50}$ (d) $\frac{7}{25}$

C14. Cards numbered 11 to 60 are mixed well. One card is drawn. The probability that its number is a perfect square is: [1]

(a) $\frac{3}{50}$ (b) $\frac{1}{10}$ (c) $\frac{2}{25}$ (d) $\frac{4}{25}$

C15. Cards numbered 2 to 81 are put in a box and one is drawn at random. The probability that its number is a perfect square or a perfect cube is: MUST DO [1]

(a) $\frac{1}{8}$ (b) $\frac{11}{80}$ (c) $\frac{9}{80}$ (d) $\frac{3}{40}$

C16. A number is selected at random from 1, 2, 3, …, 15. The probability that it is a prime number greater than 5 is: [1]

(a) $\frac{4}{15}$ (b) $\frac{1}{5}$ (c) $\frac{1}{3}$ (d) $\frac{2}{15}$

C17. Cards numbered 7 to 106 are placed in a box. One card is drawn at random. Find the probability that the number on the card is: MUST DO [2]

(i) a perfect square (ii) a two-digit number

C18. Thirty cards numbered 1 to 30 are shuffled. One card is drawn at random. Find the probability that its number is: [2]

(i) divisible by both 2 and 3

(ii) a prime number greater than 10

C19. A box contains 100 cards numbered 1 to 100. One card is drawn at random. Find the probability that its number is: [3]

(i) even but not divisible by 4

(ii) a perfect cube

(iii) divisible by 7

C20. Tickets bearing the even numbers 2, 4, 6, …, 50 are put in a bag. One ticket is drawn at random. Find the probability that its number is: [3]

(i) a multiple of 4 (ii) a number ending in 0 (iii) a perfect square

Rules: complement, sure and impossible events

★★★ 5 of 8 papers · 1 mark

C21. If $P(E) = 0.37$, then $P(\text{not } E)$ is: [1]

(a) 0.37 (b) 1.37 (c) 0.63 (d) 0.73

C22. If the probability of an event is p, the probability of its complementary event is: [1]

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

C23. The probability of guessing the correct answer to a question is $\frac{x}{12}$. If the probability of not guessing it correctly is $\frac{3}{4}$, then x is: [1]

(a) 4 (b) 9 (c) 3 (d) 6

C24. Which of the following is a sure event? [1]

(a) Getting 7 on a die

(b) Getting a number less than 7 on a die

(c) Getting a head on tossing a coin

(d) Drawing a red ball from a bag of blue balls

C25. ASSERTION–REASON [1]

Assertion (A): The probability of choosing a natural number from the numbers 1 to 25 is 1.

Reason (R): The probability of a sure event is 1.

C26. ASSERTION–REASON [1]

Assertion (A): When a die is thrown, "getting a number less than 4" and "getting a number greater than 4" are complementary events.

Reason (R): If E and F are complementary events, then $P(E) + P(F) = 1$.

C27. ASSERTION–REASON [1]

Assertion (A): A batsman hits 12 fours in the 60 balls he faces. The probability that he does not hit a four off a ball is $\frac{4}{5}$.

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

Cards from a pack

★★☆ 4 of 8 papers · 1–3 marks

C28. A card is drawn from a well-shuffled pack of 52 cards. The probability that it is a red face card is: [1]

(a) $\frac{3}{13}$ (b) $\frac{3}{26}$ (c) $\frac{1}{13}$ (d) $\frac{6}{13}$

C29. A card is drawn from a pack of 52 cards. The probability that it is neither a heart nor a king is: [1]

(a) $\frac{3}{4}$ (b) $\frac{4}{13}$ (c) $\frac{9}{13}$ (d) $\frac{10}{13}$

C30. 3 hearts and 5 clubs are missing from a pack of 52 cards. A card is drawn at random from the rest. The probability that it is a diamond is: MUST DO [1]

(a) $\frac{13}{44}$ (b) $\frac{1}{4}$ (c) $\frac{5}{22}$ (d) $\frac{2}{11}$

C31. All four kings are removed from a pack of 52 cards. A card is drawn from the rest. The probability that it is a heart is: [1]

(a) $\frac{13}{48}$ (b) $\frac{3}{13}$ (c) $\frac{1}{12}$ (d) $\frac{1}{4}$

C32. One card is drawn from a well-shuffled pack of 52 cards. Find the probability of getting: [2]

(i) a black card that is not a king

(ii) a red number card (2 to 10)

C33. The jack, queen and king of spades are removed from a pack of 52 cards. One card is drawn from the remaining cards. Find the probability that it is: MUST DO [3]

(i) a face card (ii) a spade (iii) a black card

C34. The two red aces and the two black queens are removed from a pack of 52 cards. One card is drawn from the rest. Find the probability that it is: [3]

(i) a red card (ii) a queen (iii) an ace or a king

Data and case-based probability

★☆☆ 2 of 8 papers · 1–4 marks

C35. In a survey of 200 families of a town, 64 families use only a car, 48 use only a scooter, 18 use both and the rest use neither. One family is chosen at random. Find the probability that the family: [2]

(i) uses a car

(ii) uses neither a car nor a scooter

C36. Out of 250 mobile phones checked, the probability that a phone is defective is 0.04. The number of phones that are not defective is: [1]

(a) 10 (b) 240 (c) 225 (d) 246

Coins

★☆☆ 1 of 8 papers · 1–2 marks

C37. Two coins are tossed together. The probability of getting at most one head is: [1]

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) 1 (d) $\frac{3}{4}$

C38. Three coins are tossed together. Find the probability of getting: [2]

(i) at least two tails (ii) no tail

C39. ASSERTION–REASON [1]

Assertion (A): When two coins are tossed, the probability of getting exactly one head is $\frac{1}{2}$.

Reason (R): HT and TH are different outcomes, so tossing two coins has 4 equally likely outcomes.

Calendar and letters

★☆☆ 1 of 8 papers · 1–2 marks

C40. The probability that a non-leap year has 53 Fridays is: [1]

(a) $\frac{2}{7}$ (b) $\frac{1}{7}$ (c) $\frac{52}{365}$ (d) $\frac{1}{52}$

C41. ASSERTION–REASON [1]

Assertion (A): The probability that a leap year has 53 Tuesdays is $\frac{2}{7}$.

Reason (R): The probability that a non-leap year has 53 Tuesdays is $\frac{2}{7}$.

C42. A letter is chosen at random from the letters of the word EXAMINATION. Find the probability that the letter is: [2]

(i) a vowel (ii) the letter N

PART D · SECTION E STYLE

D Case-Based Questions

Each case carries 4 marks (1 + 1 + 2), as in Section E of the board paper. Read the situation carefully before answering.

D1. Case Study · Ludo Evening [4]

Neha and her brother play a board game in which two dice are thrown together on each turn. A doublet gives an extra turn, and a token can leave its home square only when the total on the two dice is 10 or more.

(i) What is the probability of getting a doublet? [1]

(ii) What is the probability that the total is exactly 10? [1]

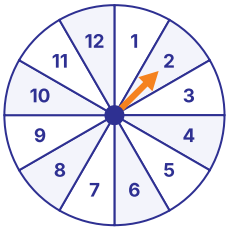
(iii) Find the probability that a token can leave its home square on a turn, and the probability that it cannot. [2]

OR

(iii) Find the probability that the total on the two dice is a prime number. [2]

D2. Case Study · Spin the Wheel [4]

At the school fete, a wheel is divided into 12 equal sectors numbered 1 to 12. A player spins the arrow and it is equally likely to stop at any sector. A player wins a prize if the arrow stops at a prime number.



(i) Find the probability that the arrow stops at a multiple of 3. [1]

(ii) Find the probability that the arrow stops at a factor of 12. [1]

(iii) Find the probability that a player wins a prize, and the probability that a player does not win. [2]

OR

(iii) Find the probability that the arrow stops at an even prime or at a number greater than 9. [2]

D3. Case Study · Toffee Jar [4]

A shopkeeper has a jar with 15 mango toffees and some orange and lime toffees. A child picks one toffee at random. The probability of picking an orange toffee is $\frac{1}{3}$ and that of a lime toffee is $\frac{1}{6}$.

(i) What is the probability of picking a mango toffee? [1]

(ii) How many toffees are there in the jar? [1]

(iii) How many orange toffees and how many lime toffees are there? [2]

OR

(iii) If 6 more lime toffees are put into the jar, find the probability of picking a lime toffee. [2]

D4. Case Study · Blood Donation Camp [4]

At a blood donation camp, 50 people donated blood: 18 had blood group O+, 12 had A+, 15 had B+ and 5 had AB+. One donor is chosen at random to receive a certificate on stage.

(i) Find the probability that the donor has blood group AB+. [1]

(ii) Find the probability that the donor does not have blood group O+. [1]

(iii) Find the probability that the donor has blood group A+ or B+, and the probability that the donor has neither A+ nor B+. [2]

OR

(iii) If 10 more O+ donors join, find the new probability that the chosen donor has blood group O+. [2]

E

PART E · FOR 95+

Challenge Questions

Harder than the usual board question. Try these after Parts A–D: they build the counting skill needed for the toughest 3-mark questions.

E1. Two dice are thrown together. Find the probability that the product of the numbers is a multiple of 3. [3]

E2. A die is thrown twice. Find the probability that the larger of the two numbers obtained is 4. [3]

E3. A number x is chosen at random from 1, 2, 3, 4 and a number y from 1, 4, 9, 16. Find the probability that $xy < 16$. [3]

E4. Two friends are each asked to choose a number from 1 to 5 at random. Find the probability that they choose the same number. [2]

E5. A number is chosen at random from 1 to 100. Find the probability that it is neither a multiple of 2 nor a multiple of 5. [3]

E6. In a bag, red and green balls are in the ratio 3 : 5. When 8 more red balls are added, the ratio becomes 1 : 1. Find the number of balls in the bag at first, and the probability of drawing a red ball before and after adding the balls. [3]

E7. Each of two dice has the numbers 1, 2, 2, 3, 3, 3 on its six faces. Both are thrown together. Find the probability that the total score is: [3]

(i) 6 (ii) 2 (iii) 4

F

PART F · REAL BOARD QUESTIONS

Board PYQ Index

Real questions from the 2024–2026 Maths Standard papers and the 2026–27 Sample Paper, by type. Open the official paper and solve the listed questions.

Frequency	Question type	Marks	Where asked (year: paper code, question number)	Practise here
★★★	**Two dice**	1–3	**2026:** 30/3/3 Q2, code not shown Q31 · **2025:** 30/1/1 Q31 (30/1/2 Q28) · **2024:** 30/1/1 Q16, 30/2/1 Q8, 30/3/1 Q3 · **SQP 2026–27:** Q13, Q25	A21, A23, B5, B16, C1–C12, D1, E1–E2
★★★	**Numbered cards / tickets / discs**	1–2	**2025:** 30/6/2 Q22 · **2024:** 30/1/1 Q8 & Q37(ii), 30/2/1 Q13, 30/3/1 Q15 · **SQP 2026–27:** Q9	A17, B4, B6, B17, C13–C20, D2, E5
★★★	**Rules, complement, sure / impossible**	1	**2026:** code not shown Q18 · **2025:** 30/1/1 Q19 (30/1/2 Q20), 30/6/2 Q20 · **2024:** 30/1/1 Q2, 30/1/2 Q7, 30/3/1 Q4	A1, A4–A7, B1, B12, C21–C27
★★☆	**Cards from a pack**	1–2	**2025:** 30/1/1 Q13 (30/1/2 Q8) · **2024:** 30/1/3 Q7, 30/3/1 Q21 · **SQP 2026–27:** Q18	A13–A14, B3, C28–C34
★☆☆	**Data / case-study based**	1–4	**2024:** 30/2/1 Q38 (travel survey chart), 30/3/1 Q20 (balls faced by a batsman)	A9, A19, C27, C35–C36, D3–D4
★☆☆	**Coins**	1	**2025:** 30/6/2 Q10	A22, A24, B13–B14, C37–C39
★☆☆	**53 Sundays / Mondays**	1	**2026:** code not shown Q19 (assertion–reason)	B9, C40–C41

PAPERS CHECKED (7 BOARD PAPERS + SAMPLE PAPER)

- **2026:** 30/3/3, and one more 2026 Standard paper whose code was not printed on the copy found
- **2025:** 30/1 (sets 1 and 2), 30/6/2
- **2024:** 30/1 Delhi (sets 1–3), 30/2 Outside Delhi (set 1), 30/3/1
- **CBSE Sample Paper 2026–27** (Mathematics Standard)

Sets of one code family (30/1/1, 30/1/2, 30/1/3) share most questions, so they count as one paper. Download the official papers from cbse.gov.in → Previous Year Question Papers, and solve the exact questions listed above.

PART G · YOUR RECORD

G My Mistakes

Write down each mistake from this chapter, including the zero-period chapter test.

Every wrong answer is a free lesson. Write it here, find the rule you missed, and redo the question after three days. Bring this page to class before the next test.

Date	Part & Q No.	What went wrong	Correct rule or method	Redone ✓