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CLASS X · MATHEMATICS BASIC (241) · CBSE BOARD EXAMINATION 2027

CHAPTER 14 **BASIC**

# Probability

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

6 guided method questions | 43 practice questions | 3 case studies | Basic (430 series) board question index

## INSIDE THIS BOOKLET


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## STUDENT DETAILS

NAME _____

CLASS & SECTION _____

ROLL NO. _____

BOOKLET STARTED ON _____

CHAPTER TEST SCORE _____ / 20

1

READ THIS FIRST · MATHEMATICS BASIC

# Chapter Notes

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 $P(\text{not } E) = 1 - P(E)$

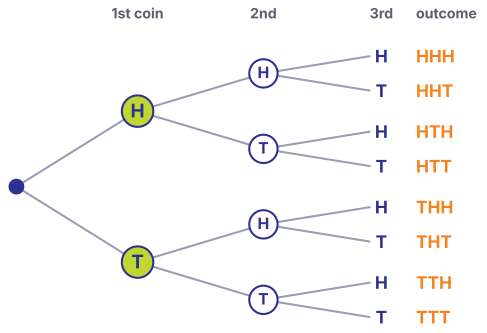
- The probabilities of all the elementary events of an experiment add up to 1. Coin: $P(H) + P(T) = \frac{1}{2} + \frac{1}{2} = 1$.
- If $P(\text{win}) = 0.79$, then $P(\text{lose}) = 0.21$. If $P(E) = p$, then $P(\text{not } E) = 1 - p$.
- **Careful:** "less than 3" and "more than 3" on a die are **not** 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. Basic papers give two or three 1-mark questions on Probability plus one 2- or 3-mark question. The 2026–27 Sample Paper also has a 4-mark case study on it. These are full-marks questions if you show the steps.

### MOST ASKED IN BASIC BOARD PAPERS, 2024–2026 + SAMPLE PAPER 2026–27 (4 PAPERS CHECKED)

| How often | Question type | Marks | Papers |
|---|---|---|---|
| ★★★ | Rules: $P(\text{not } E) = 1 - P(E)$, range 0 to 1, impossible event, values that cannot be a probability | 1 | 4 of 4 |
| ★★★ | Two dice: doublet, sum, at least one 6, even numbers on both | 1–3 | 3 of 4 |
| ★★★ | Cards from a pack of 52 (with some cards removed in 3-mark questions) | 1–3 | 3 of 4 |
| ★★☆ | Defective items or data (pens, T-shirts) | 2–4 | 2 of 4 |
| ★★☆ | Letters of a word | 1–2 | 2 of 4 |
| ★☆☆ | Bag of balls with an unknown number | 2 | 1 of 4 |
| ★☆☆ | Numbers from a range: primes, multiples | 2 | 1 of 4 |
| ★☆☆ | Coins (three coins) | 1 | 1 of 4 |

### MISTAKES THAT COST MARKS

- Writing only the answer. In Basic papers the **total and the favourable outcomes carry marks** – always write them.
- Two coins: taking HT and TH as one outcome. There are **4** outcomes.
- Two dice: there are **36** outcomes, not 12 and not 11.
- Forgetting the **new total** when cards are removed.
- Counting an ace as a face card, or 1 as a prime.
- Not reducing the fraction, or giving an answer above 1.

### HOW TO USE THIS BOOKLET

1. **Day 1:** Notes, then Part A (guided methods) – fill every blank.
2. **Day 2:** Part B (NCERT practice). Do every MUST DO question first.
3. **Day 3:** Part C (board pattern), Part D (case studies) and the real board questions in Part E.
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 · LEARN THE METHODS

# A Guided Practice

Fill in the blanks to learn each board method step by step. Then use the same steps on your own in Part B.

## Sample spaces

Fill in the blanks

**A1.** Complete the table. MUST DO [2]

| Experiment | All possible outcomes | Number |
|---|---|---|
| Toss one coin | H, T | 2 |
| Toss two coins | HH, _____, _____, TT | _____ |
| Toss three coins | HHH, HHT, HTH, _____, HTT, THT, _____, TTT | _____ |
| Throw one die | _____ | _____ |
| Throw two dice | (1, 1), (1, 2), …, (6, 6) | _____ |

## Finding a probability step by step

Fill in the blanks

**A2.** Two dice are thrown together. Complete the steps to find the probability that the sum is 9. [2]
MUST DO

Total number of outcomes = _____.

Favourable outcomes: (3, 6), (6, 3), (4, ___), (___, 4) → _____ outcomes.

$P(\text{sum } 9) = \frac{\square}{36} =$ _____.

**A3.** One card is drawn from a well-shuffled pack of 52 cards. Complete the steps to find the probability that it is a red king. [2]
MUST DO

Total number of cards = _____.

The red suits are _____ and _____.

Red kings: king of _____ and king of _____ → _____ cards.

$P(\text{red king}) =$ _____ = _____.

**A4.** A bag has 5 red, 7 green and 8 blue balls. One ball is taken out at random. Complete the steps to find the probability that it is not green. [2]

Total number of balls = _____ + _____ + _____ = _____.

$P(\text{green}) =$ _____.

$P(\text{not green}) = 1 -$ _____ = _____.

**A5.** Complete the reasoning to find the probability that a leap year has 53 Sundays. [2]

A leap year has _____ days = 52 weeks + _____ days.

The two extra days can be: (Sun, Mon), (Mon, Tue), (Tue, Wed), (Wed, Thu), (Thu, Fri), (Fri, Sat), (_____, _____) → _____ pairs.

Pairs that contain a Sunday: _____ → $P =$ _____.

## Sure and impossible events

**A6.** Write whether each event is *sure*, *impossible* or *neither*, and write its probability. [2]

(i) Getting 7 when a die is thrown.

(ii) Getting a number less than 7 when a die is thrown.

(iii) Drawing a red ball from a bag that has only red balls.

(iv) Getting a head when a coin is tossed.

PART B · NCERT PRACTICE

# B NCERT Practice

The same skills as the NCERT examples and exercise, with new numbers. Basic papers are built on NCERT, so finish every question.

## Rules and simple events

**B1.** Which of the following cannot be the probability of an event? [1]

(a) 0.25 (b) $\frac{2}{3}$ (c) 1.3 (d) 0

**B2.** If $P(E) = 0.25$, what is the probability of "not $E$"? [1]

**B3.** A bag contains 3 red balls and 5 white balls. One ball is drawn at random. Find the probability that it is: MUST DO [2]

(i) red (ii) not red

**B4.** A box contains 5 red, 8 white and 7 green marbles. One marble is taken out at random. Find the probability that it is: MUST DO [3]

(i) red (ii) white (iii) not green

**B5.** A die is thrown once. Find the probability of getting: MUST DO [3]

(i) a number greater than 4

(ii) a multiple of 3

(iii) a number less than 6

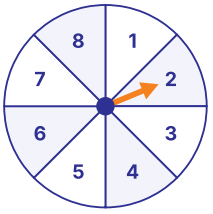
**B6.** One card is drawn from a well-shuffled pack of 52 cards. Find the probability of getting: MUST DO [3]

(i) a red king (ii) a face card (iii) the ace of spades

**B7.** An arrow is spun and stops at one of the numbers 1 to 8 (see the figure). All the outcomes are equally likely. Find the probability that it stops at: [2]

(i) 6

(ii) a number greater than 2




## Everyday situations

**B8.** 8 defective pens are mixed by mistake with 112 good pens. One pen is taken out at random. Find the probability that it is good. [1]

**B9.** A box contains 50 discs numbered 1 to 50. One disc is taken out at random. Find the probability that it bears: [2]

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

**B10.** A die is thrown twice. Find the probability that: [2]

(i) 4 does not come up either time

(ii) 4 comes up at least once

**B11.** Two coins are tossed together. Find the probability of getting: MUST DO [2]

(i) two heads (ii) at least one tail

**B12.** A jar has 30 marbles, some blue and the rest red. The probability of drawing a blue marble is $\frac{2}{5}$. Find the number of red marbles. [2]

**B13.** In a lucky draw there are 200 tickets. 10 tickets carry a watch as prize, 30 carry a pen and the rest are blank. One ticket is drawn at random. Find the probability of: [2]

(i) winning a watch (ii) getting a blank ticket

**B14.** Two dice are thrown together. Write all the outcomes that give a sum of 7. Find the probability that the sum is 7, and that the sum is not 7. MUST DO [2]

## C

PART C · BOARD PATTERN (BASIC)

# Board Pattern Practice

Question types from real 2024–2026 Mathematics Basic papers (430 series) and the 2026–27 Sample Paper. ★★★ = asked in 3 or 4 of the 4 papers · ★★ = 2 papers · ★ = 1 paper.

**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.

### Rules: complement, range, impossible event

★★★ 4 of 4 Basic papers · 1 mark

**C1.** If the probability of winning a game is $p$, the probability of losing it is: [1]

(a) $p$ (b) $1+p$ (c) $1-p$ (d) $p-1$

**C2.** Which of the following cannot be the probability of an event? [1]

(a) $\frac{1}{0.85}$ (b) $35\%$ (c) $0.85$ (d) $\frac{2}{9}$

**C3.** For any event $E$, which of the following is always true? [1]

(a) $0 < P(E) < 1$ (b) $0 \le P(E) \le 1$ (c) $-1 \le P(E) \le 1$ (d) $0 \le P(E) < 1$

**C4.** A bag has only red and white balls. If the probability of drawing a red ball is $\frac{3}{8}$, the probability of drawing a white ball is: [1]

(a) $\frac{1}{8}$ (b) $\frac{3}{8}$ (c) $1$ (d) $\frac{5}{8}$

**C5.** ASSERTION–REASON [1]

**Assertion (A):** The probability of getting 9 when a die is thrown is 0.

**Reason (R):** The probability of an impossible event is 0.

**C6.** In a game, a player wins if a die shows 5 or 6. The probability that the player loses is: [1]

(a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{5}{6}$ (d) $\frac{1}{6}$

## Two dice

★★★ 3 of 4 Basic papers · 1–3 marks

**C7.** Two dice are thrown together. The probability of getting a doublet is: [1]

(a) $\frac{1}{36}$ (b) $\frac{1}{12}$ (c) $\frac{1}{6}$ (d) $\frac{5}{6}$

**C8.** Two dice are thrown together. The probability that the sum of the numbers is 11 is: [1]

(a) $\frac{1}{18}$ (b) $\frac{1}{12}$ (c) $\frac{1}{9}$ (d) $\frac{1}{36}$

**C9.** Two dice are thrown together. The probability of getting at least one 5 is: [1]

(a) $\frac{25}{36}$ (b) $\frac{1}{6}$ (c) $\frac{1}{3}$ (d) $\frac{11}{36}$

**C10.** Two dice are thrown at the same time. Find the probability that: MUST DO [2]

(i) the sum of the numbers is 6

(ii) the sum is not 6

**C11.** Two dice are thrown at the same time. Find the probability of getting: MUST DO [3]

(i) an even number on both dice

(ii) a sum more than 8

(iii) a doublet

**C12.** Two dice are thrown at the same time. Find the probability that: [3]

(i) the sum is 5

(ii) a prime number appears on each die

(iii) the sum is at least 11

## Cards from a pack

★★★ 3 of 4 Basic papers · 1–3 marks

**C13.** One card is drawn from a well-shuffled pack of 52 cards. The probability that it is the jack of clubs is: [1]

(a) $\frac{1}{13}$ (b) $\frac{1}{52}$ (c) $\frac{1}{26}$ (d) $\frac{1}{4}$

**C14.** One card is drawn from a pack of 52 cards. The probability that it is a black king is: [1]

(a) $\frac{1}{13}$ (b) $\frac{1}{52}$ (c) $\frac{1}{26}$ (d) $\frac{2}{13}$

**C15.** One card is drawn from a pack of 52 cards. The probability that it is a face card is: [1]

(a) $\frac{3}{13}$ (b) $\frac{1}{13}$ (c) $\frac{3}{26}$ (d) $\frac{4}{13}$

**C16.** One card is drawn from a well-shuffled pack of 52 cards. Find the probability that it is: [2]
MUST DO

(i) a spade (ii) not a face card

**C17.** All the jacks and aces 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) the king of hearts (ii) a red card (iii) a face card

**C18.** The two red queens and the two black jacks 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 king (iii) a face card

## Defective items and data

★★☆ 2 of 4 Basic papers · 2–4 marks

**C19.** A lot of 180 bulbs contains 18 defective bulbs. One bulb is taken out at random. Find the probability that it is: MUST DO [2]

(i) defective (ii) not defective

**C20.** 20 faulty pens are mixed with 140 good pens. One pen is taken out at random. Find the probability that it is: [2]

(i) good (ii) faulty

**C21.** In a lot of 600 shirts, the probability that a shirt is defective is 0.05. The number of good shirts is: [1]

(a) 30 (b) 570 (c) 60 (d) 595

## Letters of a word

★★☆ 2 of 4 Basic papers · 1–2 marks

**C22.** A letter is chosen at random from the letters of the word MATHEMATICS. The probability that it is a vowel is: [1]

(a) $\frac{1}{11}$ (b) $\frac{2}{11}$ (c) $\frac{3}{11}$ (d) $\frac{4}{11}$

**C23.** A letter is chosen at random from the letters of the word ASSESSMENT. Find the probability that it is: [2]

(i) the letter S (ii) a vowel

## Bag of balls with an unknown number

★☆☆ 1 of 4 Basic papers · 2 marks

**C24.** A bag contains 6 red balls, 9 white balls and some yellow balls. The probability of drawing a red ball is $\frac{1}{5}$. Find the probability of drawing a yellow ball. MUST DO [2]

**C25.** A box contains 15 balls, of which $x$ are white. If 5 more white balls are put in, the probability of drawing a white ball becomes double. Find $x$. [2]

## Numbers from a range

★☆☆ 1 of 4 Basic papers · 1–2 marks

**C26.** A number is chosen at random from the numbers 20, 21, 22, …, 50. Find the probability that it is: [2]

(i) a prime number (ii) a multiple of 4

**C27.** Cards numbered 1 to 25 are mixed well. One card is drawn. The probability that its number is a perfect square is: [1]

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

### Coins

★☆☆ 1 of 4 Basic papers · 1 mark

**C28.** Three coins are tossed together. The probability of getting exactly two tails is: [1]

(a) $\frac{1}{2}$ (b) $\frac{1}{8}$ (c) $\frac{1}{4}$ (d) $\frac{3}{8}$

**C29.** Two coins are tossed together. The probability of getting no head is: [1]

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) $0$

## D

PART D · SECTION E STYLE

## Case-Based Questions

Each case carries 4 marks (1 + 1 + 2), as in Section E of the board paper. Underline the numbers in the passage before you start.

### D1. Case Study · Board Game [4]

In a board game, each player throws two dice together. A player moves a token only if the sum of the two numbers is more than 8.

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

(ii) What is the probability that the sum is 4? [1]

(iii) Find the probability that a player moves a token on a turn, and the probability that the player does not. [2]

OR

(iii) Find the probability that both numbers are odd, and the probability that at least one number is even. [2]

### D2. Case Study · Shoe Factory [4]

A factory made 500 pairs of shoes in a day. 440 pairs are good, 45 pairs have a minor defect and the rest have a major defect. Shopkeeper Arun buys only good pairs. Shopkeeper Bina buys any pair that has no major defect. One pair is picked at random.

(i) What is the probability that Arun buys the pair? [1]

(ii) What is the probability that Bina buys the pair? [1]

(iii) Find the probability that the pair is not good. [2]

OR

(iii) Find the probability that neither Arun nor Bina buys the pair. [2]

### D3. Case Study · Card Game [4]

Rohit removes all four aces from a pack of 52 playing cards. Priya shuffles the remaining cards and draws one card at random.

(i) What is the probability that the card is a king? [1]

(ii) What is the probability that the card is red? [1]

(iii) Find the probability that the card is a face card, and the probability that it is not a face card. [2]

OR

(iii) Find the probability that the card is a black number card (2 to 10). [2]

PART E · REAL BOARD QUESTIONS

## E Board PYQ Index (Basic)

Real questions from the Mathematics Basic (430 series) 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 |
|---|---|---|---|---|
| ★★★ | **Rules, complement, range** | 1 | **2026:** 430/5/2 Q1 · **2024:** 430/1/1 Q7, 430/1/2 Q11, 430/1/3 Q13, 430/2/1 Q12 · **SQP 2026–27:** Q19 | A6, B1–B2, C1–C6 |
| ★★★ | **Two dice** | 1–3 | **2026:** 430/5/2 Q3 · **2024:** 430/1/1 Q18, 430/1/3 Q15, 430/2/1 Q26 | A2, B10, B14, C7–C12, D1 |
| ★★★ | **Cards from a pack** | 1–3 | **2026:** 430/5/2 Q13 · **2024:** 430/1/1 Q10, 430/2/3 Q28 | A3, B6, C13–C18, D3 |
| ★★☆ | **Defective items / data** | 2–4 | **2024:** 430/2/1 Q23, 430/2/2 Q22 · **SQP 2026–27:** Q38 (case study) | B8, B13, C19–C21, D2 |
| ★★☆ | **Letters of a word** | 1–2 | **2026:** 430/5/2 Q25(b) · **SQP 2026–27:** Q9 | C22–C23 |
| ★☆☆ | **Bag with an unknown number** | 2 | **2024:** 430/1/1 Q25 | A4, B3–B4, B12, C24–C25 |
| ★☆☆ | **Numbers from a range** | 2 | **2026:** 430/5/2 Q25(a) | B9, C26–C27 |
| ★☆☆ | **Coins** | 1 | **2024:** 430/1/2 Q8 | A1, B11, C28–C29 |

**Papers checked (4):** 2026 – 430/5/2 · 2024 – 430/1 Delhi (sets 1–3), 430/2 Outside Delhi (sets 1–3) · CBSE Sample Paper 2026–27 (Mathematics Basic). The 2025 Basic papers could not be read online. Sets of one code family share most questions, so they count as one paper. Download the official papers from cbse.gov.in → Previous Year Question Papers → Mathematics Basic.

PART F · YOUR RECORD

# F 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 ✓ |
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