CHAPTER 1

Sets

CBSE Class 11 · Mathematics · Chapter 1

CBSE · Mathematics · Class 11

WHAT THIS CHAPTER DOES

A Describe any collection in both roster and set-builder form, and classify it as empty, finite or infinite.

B Decide subset / proper subset / equal / equivalent correctly, and count subsets with 2^n.

Boards prep that builds confidence, not anxiety.

TODAY'S MISSION

Today's mission

1. Describe any collection in both roster and set-builder form, and classify it as empty, finite or infinite.
2. Decide subset / proper subset / equal / equivalent correctly, and count subsets with 2^n.
3. Operate on sets — union, intersection, difference, complement — and apply De Morgan's laws.
4. Solve survey word problems with $n(A \cup B) = n(A) + n(B) - n(A \cap B)$ and score 5/6 on Unit I.

WHY THIS MATTERS

Why this chapter matters

1. Sets is the FIRST chapter of Class 11 and the foundation of Unit I (Sets and Functions) — the very next chapter, Relations and Functions, is built entirely on it.

2. Every branch of higher maths — probability, calculus, linear algebra — is written in the language of sets; mastering the notation now pays off for two years.

3. It is one of the most scoring chapters: little calculation, high reward for careful reading and neat Venn diagrams. The cardinality word problem alone is near-guaranteed marks.

TOPIC

A

Fundamentals — what is a set, and how do we write it?

TOPIC

Representing a set · roster vs set-builder

WHAT A SET IS

A set is a well-defined collection of distinct objects, called its elements or members. 'Well-defined' is the key word: given any object, we must be able to decide unambiguously whether it belongs to the set or not. So 'the set of vowels in English' is a set, but 'the set of tall students' is not, because

ROSTER (TABULAR) FORM

In roster form we simply LIST all the elements inside braces, separated by commas. For example, the set of vowels is {a, e, i, o, u}; the set of the first four prime numbers is {2, 3, 5, 7}. For a set with a clear, continuing pattern we may use three dots: the natural numbers are {1, 2, 3, 4, ...} and even numbers between 0 and

SET-BUILDER FORM

In set-builder form we describe a set by the COMMON PROPERTY its elements share, rather than listing them. The shape is $\{x : P(x)\}$, read 'the set of all x such that P(x) is true' (the colon, sometimes a vertical bar |, means 'such that'). For example $\{x : x \text{ is a natural number and } x < 6\} = \{1, 2, 3, 4, 5\}$ and $\{x : x^2 =$

STANDARD NUMBER SETS

Certain sets are so common that they have reserved symbols: N = natural numbers {1, 2, 3, ...}; W = whole numbers {0, 1, 2, ...}; Z = integers {..., −2, −1, 0, 1, 2, ...} (from the German 'Zahlen'); Q = rational numbers (all p/q with $q \neq 0$); R = real numbers; and the empty set ∅. These nest as $N \subset W \subset Z \subset Q \subset$

TOPIC

Empty, finite, infinite · and equal vs equivalent

THE EMPTY SET

The empty set, written ∅ or { }, is the set with NO elements at all, so its cardinality is |∅| = 0. It arises whenever a defining property is impossible: {x : x is a natural number, x < 1} = ∅, and {x ∈ R : $x^2 + 1 = 0$} = ∅ (no real square is negative). Three traps to memorise: ∅ is NOT the same as {0} (which has

FINITE AND INFINITE SETS

A set is FINITE if its elements can be counted and the counting comes to an end — {a, e, i, o, u} (5 elements), the set of days in a week (7), or even a very large but ending set like {1, 2, ..., 1000000}. A set is INFINITE if the counting never ends: N, Z, Q, R, the set of points on a line, or {x ∈ R : 0 < x < 1}

EQUAL SETS

Two sets A and B are EQUAL, written A = B, when they contain exactly the SAME elements — every element of A is in B and every element of B is in A. Because order and repetition are irrelevant, {1, 2, 3} = {3, 1, 2} = {1, 1, 2, 3}. Equality is about MEMBERSHIP, not appearance: {x : x^2 = 1, x

EQUIVALENT SETS

Two sets are EQUIVALENT when they have the same NUMBER of elements — that is, n(A) = n(B), so their members can be paired off one-to-one — regardless of WHAT those elements are. Thus {1, 2, 3} and {a, b, c} are equivalent (both size 3) but NOT equal (different members). The

TOPIC

B

Subsets, supersets, intervals and the power set

TOPIC

Subset, proper subset, superset

SUBSET

A is a SUBSET of B, written $A \subseteq B$, if every element of A is also an element of B. So $\{1, 2\} \subseteq \{1, 2, 3\}$, and $N \subseteq Z \subseteq Q \subseteq R$. Two facts hold for EVERY set: $A \subseteq A$ (every set is a subset of itself) and $\varnothing \subseteq A$ (the empty set is a subset of everything — vacuously, since it has no element that could fail the condition). The

PROPER SUBSET & SUPERSET

A is a PROPER subset of B (written $A \subsetneq B$, or $A \subset B$ in strict notation) when $A \subseteq B$ AND $A \neq B$ — that is, B contains at least one element not in A. So $\{1, 2\} \subsetneq \{1, 2, 3\}$ is proper, but $\{1, 2, 3\} \subsetneq \{1, 2, 3\}$ is FALSE — a set is never a proper subset of itself. The mirror term is SUPERSET: if $A \subseteq B$ then

SUBSETS OF R — INTERVALS

The most-tested subsets of the real numbers are INTERVALS — continuous stretches of the number line. For $a < b$: the OPEN interval $(a, b) = \{x \in R : a < x < b\}$ excludes both endpoints; the CLOSED interval $[a, b] = \{x : a \leqslant x \leqslant b\}$ includes both; and the HALF-OPEN intervals $[a, b)$ and $(a, b]$ include

NUMBER OF SUBSETS

A set with n elements has exactly 2^n subsets. The reasoning: to build a subset, each of the n elements is independently either IN or OUT — 2 choices per element — giving 2 × 2 × … × 2 = 2^n possibilities. For example {a, b, c} (n = 3) has 2^3 = 8 subsets. Of these, 2^n − 1 are PROPER subsets

THEOREM · LOAD-BEARING RESULT

The power set and its cardinality

> The power set of a set A, written P(A), is the set whose elements are ALL the subsets of A — including the empty set Ø and A itself. If A has n elements, then P(A) has exactly 2^n elements: |P(A)| = 2^|A| = 2^n.

STATEMENT

P(A) = { S : S ⊆ A }. Since each of the n elements of A is independently either included in or excluded from a subset (2 independent choices), the total number of subsets is 2^n. For A = {a, b, c}: P(A) =

WHY THIS MATTERS

- It packages 'all subsets' into one object and gives the clean counting rule 2^n
- The power set reappears in probability (sample-space subsets) and in later set-theoretic proofs.

WATCH OUT FOR

NOTE P(A) is a set OF SETS — its elements are themselves sets, so Ø ∈ P(A) and A ∈ P(A) are both TRUE. Do not confuse |P(A)| = 2^n with n^2 or 2n. And remember 2^n counts Ø and A among the subsets; proper subsets number 2^n − 1.

WORKED EXAMPLE

Power set, subsets and proper subsets of A = {1, 2, 3}

1. Here n = |A| = 3, so the number of subsets is $2^n = 2^3 = 8$ and the number of proper subsets is $2^3 - 1 = 7$.

2. List size by size — start with ∅, end with A. Size 0: ∅. Size 1: {1}, {2}, {3}. Size 2: {1,2}, {1,3}, {2,3}. Size 3: {1,2,3}.

3. Hence P(A) = { ∅, {1}, {2}, {3}, {1,2}, {1,3}, {2,3}, {1,2,3} }. Count the listed sets: 8 ✓, matching 2^3.

4. The 7 proper subsets are all of these EXCEPT {1,2,3} itself. Note ∅ ∈ P(A) and {1,2,3} ∈ P(A) are both correct.

TRY IT · SOLVE BEFORE YOU PEEK

A set B has 4 elements. (a) How many subsets does B have? (b) How many proper subsets? (c) Is Ø an element of P(B)? (d) True or False: B is a proper subset of itself.

SOLUTION

ANSWER (a) $2^4 = 16$ subsets. (b) $2^4 - 1 = 15$ proper subsets. (c) Yes — $\varnothing \subseteq B$, so $\varnothing \in P(B)$. (d) False — $B \subseteq B$ but B is NOT a proper subset of itself (a proper subset must be unequal to the set).

TOPIC

C

The universal set, Venn diagrams and set operations

TOPIC

Universal set · union · intersection · difference

UNIVERSAL SET & VENN DIAGRAMS

In any given discussion all the sets considered are subsets of one big fixed set called the UNIVERSAL SET, denoted U. For a problem about numbers from 1 to 10, U = {1, 2, ..., 10}; for a survey of a class, U is the whole class. A VENN DIAGRAM pictures U as a rectangle and each set as

UNION (A∪B)

The UNION of A and B, written A∪B, is the set of elements that belong to A OR to B (or to both) — everything in either circle: A∪B = {x : x ∈ A or x ∈ B}. For A = {1, 2, 3} and B = {3, 4, 5}, A∪B = {1, 2, 3, 4, 5} — note the common element 3 is listed only ONCE. On a Venn diagram, union is the whole shaded area of

INTERSECTION (A∩B)

The INTERSECTION of A and B, written A∩B, is the set of elements common to BOTH — the overlap of the two circles: A∩B = {x : x ∈ A AND x ∈ B}. For A = {1, 2, 3} and B = {3, 4, 5}, A∩B = {3}. If A∩B = ∅ the sets share nothing and are called DISJOINT (their circles do not overlap). Intersection is commutative and

DIFFERENCE (A − B)

The DIFFERENCE A – B (also written A \ B) is the set of elements in A but NOT in B: A – B = {x : x ∈ A and x ∉ B}. For A = {1, 2, 3, 4} and B = {3, 4, 5}, A – B = {1, 2} (drop the shared 3 and 4) while B – A = {5}. Note difference is NOT commutative: in general A – B ≠ B – A. On a Venn diagram, A – B is the part of circle A lying

THEOREM · LOAD-BEARING RESULT

Complement of a set, and De Morgan's laws

> The COMPLEMENT of A (relative to the universal set U) is $A' = U - A = \{x \in U : x \notin A\}$ — everything in U that is NOT in A. De Morgan's two laws then state: $(A \cup B)' = A' \cap B'$ and $(A \cap B)' = A' \cup B'$.

STATEMENT

Basic facts: $(A')' = A$, $\varnothing' = U$, $U' = \varnothing$, $A \cup A' = U$ and $A \cap A' = \varnothing$. De Morgan: the complement of a UNION is the INTERSECTION of the complements, and the complement of an

WHY THIS MATTERS

- Complement and De Morgan's laws let you rewrite complicated set expressions and are essential in probability ('not (A or B)' = 'not A and not B')
- They are near-guaranteed 2-3 mark verification questions.

WATCH OUT FOR

NOTE De Morgan FLIPS the operation: $(A \cup B)' = A' \cap B'$, NOT $A' \cup B'$. The most common error is leaving the operation unchanged. Always take complements with respect to the correct universal set U — A' is meaningless without a stated U.

WORKED EXAMPLE

Operations and a De Morgan check with U = {1,···,10}

1. Let U = {1,2,3,4,5,6,7,8,9,10}, A = {2,4,6,8}, B = {1,2,3,4,5}. Then $A \cup B$ = {1,2,3,4,5,6,8} and $A \cap B$ = {2,4}.

2. Differences: A – B = {6, 8} (in A, not in B); B – A = {1, 3, 5}. Complements: A' = {1,3,5,7,9,10}, B' = {6,7,8,9,10}.

3. Check De Morgan: $(A \cup B)'$ = U – {1,2,3,4,5,6,8} = {7, 9, 10}. And $A' \cap B'$ = {1,3,5,7,9,10} ∩ {6,7,8,9,10} = {7, 9, 10}.

4. Since {7, 9, 10} = {7, 9, 10}, we have $(A \cup B)' = A' \cap B'$ verified. Also (A')' = U – {1,3,5,7,9,10} = {2,4,6,8} = A ✓.

TOPIC

D

Counting with sets — cardinality of the union

THEOREM · LOAD-BEARING RESULT

Cardinality of the union (inclusion–exclusion)

> For any two finite sets A and B: $n(A \cup B) = n(A) + n(B) - n(A \cap B)$. If A and B are disjoint ($A \cap B = \varnothing$) this reduces to $n(A \cup B) = n(A) + n(B)$. For three finite sets: $n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(A \cap C) + n(A \cap B \cap C)$.

STATEMENT

Adding $n(A)$ and $n(B)$ counts every element of the overlap $A \cap B$ exactly twice, so subtracting $n(A \cap B)$ once restores each element to a single count — this is the inclusion–exclusion principle.

WHY THIS MATTERS

- It converts 'how many people like at least one of tea/coffee?' into arithmetic, and is the highest-frequency, highest-mark stem of the whole chapter
- The same idea seeds probability's addition rule $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

WATCH OUT FOR

NOTE Never write $n(A \cup B) = n(A) + n(B)$ unless the sets are disjoint — forgetting the $-n(A \cap B)$ term is the #1 error. 'Only A' = $n(A) - n(A \cap B)$, and 'neither' = $n(U) - n(A \cup B)$. Read whether the question wants at-least-one, only-one, both, or neither.

WORKED EXAMPLE

Survey: cricket and hockey among 60 students

1. In a class of 60, 27 students play cricket (C), 24 play hockey (H), and 12 play both. So $n(C) = 27$, $n(H) = 24$, $n(C \cap H) = 12$, $n(U) = 60$.

2. At least one game: $n(C \cup H) = n(C) + n(H) - n(C \cap H) = 27 + 24 - 12 = 39$ students play at least one of the two.

3. Only cricket $= n(C) - n(C \cap H) = 27 - 12 = 15$. Only hockey $= n(H) - n(C \cap H) = 24 - 12 = 12$.

4. Neither game $= n(U) - n(C \cup H) = 60 - 39 = 21$ students. (Check: $15 + 12 + 12 + 21 = 60$ ✓ — only-C + both + only-H + neither equals the total.)

TRY IT · SOLVE BEFORE YOU PEEK

In a group of 200 people, 130 read Hindi newspapers, 80 read English newspapers, and 50 read both. (a) How many read at least one language? (b) How many read only Hindi? (c) How many read neither?

SOLUTION

ANSWER (a) $n(H \cup E) = 130 + 80 - 50 = 160$ read at least one. (b) Only Hindi = $130 - 50 = 80$. (c) Neither = $200 - 160 = 40$. (Check: only-Hindi 80 + only-English 30 + both 50 + neither 40 = 200 ✓.)

TOPIC

E

Algebraic properties of set operations

TOPIC

The algebra of unions and intersections

COMMUTATIVE & ASSOCIATIVE

Union and intersection are both COMMUTATIVE — order does not matter: $A \cup B = B \cup A$ and $A \cap B = B \cap A$. They are also ASSOCIATIVE — grouping does not matter: $(A \cup B) \cup C = A \cup (B \cup C)$ and $(A \cap B) \cap C = A \cap (B \cap C)$, so we can safely drop the inner brackets and write

DISTRIBUTIVE LAWS

Intersection distributes over union and union distributes over intersection: $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ and $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$. These are the set analogues of the number rule $a(b+c) = ab + ac$, and they are the workhorses for simplifying compound expressions. The cleanest way to PROVE a

IDENTITY & IDEMPOTENT LAWS

The empty set and the universal set act as identities: $A \cup \varnothing = A$ and $A \cap U = A$ leave a set unchanged, while $A \cap \varnothing = \varnothing$ and $A \cup U = U$ collapse it. The IDEMPOTENT laws say combining a set with itself does nothing new: $A \cup A = A$ and $A \cap A = A$ (contrast with numbers, where $a + a = 2a$). Finally

DE MORGAN'S LAWS (RECAP)

The two De Morgan's laws are the most exam-frequent identities here: $(A \cup B)' = A' \cap B'$ and $(A \cap B)' = A' \cup B'$. In words: the complement of a union is the intersection of the complements, and the complement of an intersection is the union of the complements — complementing FLIPS $\cup$

TOPIC

Element-of (∈) vs subset-of (⊂)

TRAP → TRUTH

× **MISTAKE** For $A = \{1, 2, 3\}$ we may write $1 \subset A$, and $\{1\} \in A$.

✓ **CORRECT** Use ∈ between an ELEMENT and a set, and ⊂ (or ⊆) between a SET and a set. So $1 \in A$ (1 is an element) and $\{1\} \subset A$ (the single-element set {1} is a subset). Writing $1 \subset A$ or $\{1\} \in A$ is a category error: 1 is not a set, and {1} is not listed as an element of A. The test: is the left-hand side one of the things actually written inside A's braces? If yes use ∈; if the left-hand side is itself a set built from those things, use ⊂.

TOPIC

The empty set is a subset of every set

TRAP → TRUTH

× **MISTAKE** The empty set ∅ is a subset only of itself, not of other sets like {1, 2}.

✓ **CORRECT** $\varnothing \subseteq A$ for EVERY set A, including $A = \varnothing$. The reason: '$A \subseteq B$' means every element of A is also in B; since ∅ has no elements, the condition is vacuously true for any B. So ∅ is a subset of {1, 2}, of R, of everything. Likewise ∅ always appears as a member of any power set. (Note ∅ is a SUBSET of A but generally not an ELEMENT of A — $\varnothing \subseteq \{1,2\}$ yet $\varnothing \notin \{1,2\}$.)

TOPIC

$\varnothing$ vs $\{\varnothing\}$ vs $\{0\}$ vs 0

TRAP → TRUTH

× **MISTAKE** $\varnothing$, $\{0\}$ and 0 all mean 'nothing' / the same thing.

✓ **CORRECT** They are four different objects. 0 is a NUMBER. $\varnothing$ (also written $\{\ \}$) is the EMPTY set — it has ZERO elements, so $|\varnothing| = 0$. $\{0\}$ is a set containing one element, the number 0, so $|\{0\}| = 1$ and it is NOT empty. $\{\varnothing\}$ is a set containing one element, the empty set itself, so $|\{\varnothing\}| = 1$. So $\varnothing \neq \{0\} \neq \{\varnothing\}$, and a common 1-mark trap asks 'is $\{0\}$ the empty set?' — answer NO, it has one element.

TOPIC

Proper subset and whether $A \subset A$

TRAP → TRUTH

× **MISTAKE** Every set is a proper subset of itself, so $A \subset A$ is a proper-subset statement.

✓ **CORRECT** A is a subset of itself ($A \subseteq A$ is always true), but A is NOT a PROPER subset of itself. B is a PROPER subset of A (written $B \subsetneq A$, or $B \subset A$ in the strict reading) only when $B \subseteq A$ AND $B \neq A$. A set has 2^n subsets but only $2^n - 1$ proper subsets, because we exclude A itself. Watch the textbook's symbol convention: some books use $\subset$ to mean 'subset (possibly equal)' and others to mean 'proper subset' — read the question's definition.

TOPIC

Power-set cardinality

TRAP → TRUTH

× **MISTAKE** If A has n elements, the power set P(A) has n^2 elements (or 2n elements).

✓ **CORRECT** |P(A)| = 2^n, where n = |A| — NOT n^2 and NOT 2n. For A = {a, b, c}, n = 3 and P(A) has 2^3 = 8 subsets: ∅, {a}, {b}, {c}, {a,b}, {a,c}, {b,c}, {a,b,c}. The count 2^n arises because each element is independently either IN or OUT of a given subset (2 choices each, n elements → 2 × 2 × … = 2^n). The number of PROPER subsets is 2^n – 1, and the number of non-empty subsets is also 2^n – 1.

TOPIC

Equal sets vs equivalent sets

TRAP → TRUTH

× **MISTAKE** {1, 2, 3} and {a, b, c} are equal because they each have three elements.

✓ **CORRECT** They are EQUIVALENT (same number of elements, $n = 3$, so a one-to-one matching exists), but NOT EQUAL. Two sets are EQUAL only when they contain exactly the SAME elements: $\{1, 2, 3\} = \{3, 1, 2\}$ (order and repetition don't matter) but $\{1, 2, 3\} \neq \{a, b, c\}$. Equal ⇒ equivalent, but equivalent does NOT ⇒ equal. CBSE loves this distinction in a 1-mark true/false stem.

TOPIC

Cardinality of the union

TRAP → TRUTH

× **MISTAKE** $n(A \cup B) = n(A) + n(B)$ always.

✓ **CORRECT** $n(A \cup B) = n(A) + n(B) - n(A \cap B)$. Adding $n(A)$ and $n(B)$ counts every element of the overlap $A \cap B$ TWICE, so we subtract $n(A \cap B)$ once to correct the double count (the 'inclusion–exclusion' principle). Only when A and B are DISJOINT ($A \cap B = \varnothing$, so $n(A \cap B) = 0$) does $n(A \cup B) = n(A) + n(B)$. Forgetting the $-n(A \cap B)$ term is the number-one error in survey word problems.

TOPPER TEMPLATE · MARK-BY-MARK

2-mark question: 'Write the power set of the given set A and state the number of subsets and

1 **COUNT ELEMENTS AND APPLY 2^N** 1 m

State n = |A| clearly. For A = {1, 2, 3}, n = 3, so the number of subsets is 2^n = 2^3 = 8 and the number of proper subsets is 2^n – 1 = 7. Write the formula explicitly — examiners award this mark for showing 2^n, not just the final number.

2 **LIST EVERY SUBSET SYSTEMATICALLY — NEVER MISS ∅ OR A ITSELF** 1 m

List by size: ∅ (the empty set); singletons {1}, {2}, {3}; pairs {1,2}, {1,3}, {2,3}; the whole set {1,2,3}. Hence P(A) = { ∅, {1}, {2}, {3}, {1,2}, {1,3}, {2,3}, {1,2,3} }. Always start with ∅ and finish with A — these two are the most commonly forgotten and each costs marks.

TOPPER TEMPLATE · MARK-BY-MARK

3-mark question: survey/word problem using $n(A \cup B) = n(A) + n(B) - n(A \cap B)$.

1 — TRANSLATE THE WORDS INTO SET QUANTITIES (1 m)

Define the sets explicitly: let T = people who like tea, C = people who like coffee. Write down what is given: $n(T) = 35$, $n(C) = 30$, $n(T \cap C) = 10$, total surveyed = 50. Stating each quantity in set notation earns the first mark and prevents mis-reading the question.

2 — APPLY THE INCLUSION-EXCLUSION FORMULA (1 m)

Substitute into $n(A \cup B) = n(A) + n(B) - n(A \cap B)$. e.g. if $n(A)=35$, $n(B)=30$, $n(A \cap B)=10$, then $n(A \cup B) = 35 + 30 - 10 = 55$. Always subtract the intersection once so the overlap is not double-counted; $n(A \cup B)$ can never exceed $n(A)+n(B)$.

3 — ANSWER THE EXACT QUESTION ASKED (ONLY-ONE / NEITHER) (1 m)

Read what is wanted: 'only tea' = $n(T) - n(T \cap C)$; 'only coffee' = $n(C) - n(T \cap C)$; 'neither' = total − $n(T \cup C)$. Compute the specific quantity, e.g. neither = 50 − $n(T \cup C)$. Always finish with a sentence: 'Hence ___ people like neither.' A Venn diagram filled with only-T, both, only-C secures this mark even if the formula slips.

TOPPER TEMPLATE · MARK-BY-MARK

3-mark question: 'Verify De Morgan's law (A∪B)' = A'∩B' (or (A∩B)' = A'∪B') for the given sets.'

1 — LIST U, A, B AND COMPUTE THE LEFT-HAND SIDE (1 m)

Write the universal set U and the given A, B. Compute A∪B first, then take its complement: (A∪B)' = U – (A∪B). Show the elements explicitly, e.g. U = {1..10}, A∪B = {1,2,3,4,5}, so (A∪B)' = {6,7,8,9,10}.

2 — COMPUTE THE RIGHT-HAND SIDE INDEPENDENTLY (1 m)

Find A' = U – A and B' = U – B separately, then intersect: A'∩B'. Keep the two sides on separate lines so the comparison is clean. Do NOT assume the law — actually evaluate A'∩B' from the elements.

3 — COMPARE AND CONCLUDE (VENN DIAGRAM IF ASKED) (1 m)

Show LHS = RHS element-by-element: {6,7,8,9,10} = {6,7,8,9,10} ✓, hence (A∪B)' = A'∩B' is verified. If a Venn diagram is required, shade (A∪B)' (outside both circles) and A'∩B' (outside both circles) and note the regions coincide.

PYQ PATTERNS

Top PYQ patterns to drill

#1	In a survey of N people, n(A) like tea, n(B) like coffee, n(A∩B) like both	find how many like only one / neither, using n(A∪B) = n(A)+n(B)−n(A∩B). (2-3 marks) — Almost every annual paper + CBSE SQP 2022, 2023, 2024
#2	Write the power set of a given set and/or state the number of subsets and proper subsets (2^n and 2^n – 1). (2 marks)	School Annual 2021, 2022; CBSE SQP 2023
#3	Convert a set from set-builder to roster form (often by solving an equation) or write an interval such as (2, 7] in set-builder form. (1-2 marks)	School Annual 2022, 2024; Periodic Test 2023
#4	For given sets A, B (and universal U), find A∪B, A∩B, A–B and A'. (2-3 marks)	

RECAP · MEMORISE THESE

5-line revision

1 Describe & classify — Write sets in roster or set-builder form; classify as empty / finite / infinite; distinguish EQUAL (same elements) from EQUIVALENT (same count).

2 Contain & count — Use ∈ (element) vs ⊆ (subset); ∅ ⊆ every set; a set of n elements has 2^n subsets and 2^n – 1 proper subsets; |P(A)| = 2^n.

3 Operate & count union — Union (or), intersection (and), difference, complement A' = U – A; De Morgan flips ∪↔∩; and n(A∪B) = n(A) + n(B) – n(A∩B).

WHAT'S NEXT

What's next

→ Chapter 2 — Relations and Functions (introduces the Cartesian product A × B, which is built directly on the sets you mastered here).

→ Sit the 15-MCQ Quick Drill (companion PDF) — under 20 minutes, target $\geqslant$ 12/15.

→ Then the full Annual-Pattern Paper — 30 marks, internal-exam style, with full model answers.

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