

How to use this worksheet. Thirty questions, about 35 minutes. When a question asks which set is empty, test each option one at a time rather than guessing. Subtract the overlap whenever you count a union, or the common elements get counted twice.

Formula sheet

A set with n elements has 2^n subsets and $2^n - 1$ proper subsets

Power set $P(A)$ has 2^n elements | $n(A \times B) = n(A) \times n(B)$

$n(A \cup B) = n(A) + n(B) - n(A \cap B)$

De Morgan: $(A \cup B)' = A' \cap B'$ | $(A \cap B)' = A' \cup B'$

Section A · Level 1 — Types of set and basic operations

Ten questions. None should take more than twenty seconds.

1. A set which contains no element is called:
(1) A singleton set (2) The empty set (3) A universal set (4) A power set
2. A set containing exactly one element is called:
(1) The empty set (2) A singleton set (3) A finite set (4) A power set
3. The number of subsets of a set with n elements is:
(1) n (2) $2n$ (3) 2^n (4) n^2
4. The number of proper subsets of a set with n elements is:
(1) 2^n (2) $2^n - 1$ (3) $2^n - 2$ (4) $n - 1$
5. The collection of all subsets of a set A is called:
(1) The universal set (2) The power set of A (3) The complement of A (4) The empty set
6. For any set A , the intersection $A \cap \emptyset$ equals:
(1) A (2) $\emptyset$ (3) The universal set (4) A'
7. For any set A , the union $A \cup \emptyset$ equals:
(1) $\emptyset$ (2) A (3) The universal set (4) A'
8. De Morgan's law states that $(A \cup B)'$ equals:
(1) $A' \cup B'$ (2) $A' \cap B'$ (3) $A \cap B$ (4) $A' - B'$
9. If A is a subset of B , then $A \cap B$ equals:
(1) A (2) B (3) $\emptyset$ (4) $A \cup B$
10. Two sets with no element in common are called:
(1) Equal sets (2) Equivalent sets (3) Disjoint sets (4) Subsets

Working space — Questions 1 to 10

Write the formula before you substitute.

Section B · Level 2 — Counting subsets, unions and products

Ten questions. Subtract the overlap whenever you count a union.

11. The number of subsets of a set with 5 elements is:
(1) 10 (2) 25 (3) 32 (4) 31
12. The power set of $\{1, 2, 3\}$ has how many elements?
(1) 3 (2) 6 (3) 8 (4) 9

13. If $A = \{1, 2, 3\}$ and $B = \{2, 3, 4\}$, then $A \cap B$ is:

- (1) $\{1, 2, 3, 4\}$ (2) $\{2, 3\}$ (3) $\{1\}$ (4) $\{4\}$

14. For the same sets, $A \cup B$ is:

- (1) $\{2, 3\}$ (2) $\{1, 4\}$ (3) $\{1, 2, 3, 4\}$ (4) $\{1, 2, 3\}$

15. For the same sets, $A - B$ is:

- (1) $\{1\}$ (2) $\{4\}$ (3) $\{2, 3\}$ (4) $\emptyset$

16. If $n(A) = 20$, $n(B) = 28$ and $n(A \cap B) = 8$, then $n(A \cup B)$ is:

- (1) 48 (2) 40 (3) 56 (4) 36

17. If $n(A) = 3$ and $n(B) = 4$, then $n(A \times B)$ is:

- (1) 7 (2) 12 (3) 16 (4) 81

18. Which of the following is a singleton set?

- (1) $\{x : x \text{ is an even prime number}\}$ (2) $\{x : x \text{ is a prime number less than } 10\}$ (3) $\{x : x^2 = 4\}$ (4) $\emptyset$

19. The number of elements in the power set of the power set of $\{1, 2\}$ is:

- (1) 4 (2) 8 (3) 16 (4) 2

20. The interval $[2, 5)$ written in set-builder form is:

- (1) $\{x : 2 < x < 5\}$ (2) $\{x : 2 \leq x < 5\}$ (3) $\{x : 2 \leq x \leq 5\}$ (4) $\{x : 2 < x \leq 5\}$

Working space — Questions 11 to 20 Write the formula before you substitute.

Section C · Level 3 — Complements, equality and infinite sets

Eight questions. Read the defining condition carefully before deciding.

21. If A and B are disjoint, then $n(A \cup B)$ equals:

- (1) $n(A) + n(B)$ (2) $n(A) - n(B)$ (3) $n(A) \times n(B)$ (4) 0

22. For three sets, $n(A \cup B \cup C)$ equals the sum of the individual counts, minus the three pairwise intersections, plus:

- (1) Nothing further (2) $n(A \cap B \cap C)$ (3) $2n(A \cap B \cap C)$ (4) $n(A) n(B) n(C)$

23. If $A \subseteq B$ and $B \subseteq C$, then:

- (1) $A \subseteq C$ (2) $C \subseteq A$ (3) A and C are disjoint (4) Nothing can be said

24. The complement of the universal set U is:

- (1) U (2) $\emptyset$ (3) A (4) Undefined

25. Which of the following sets is infinite?

- (1) The set of days in a week (2) The set of prime numbers (3) The set of vowels in English (4) The set of factors of 12

26. The set $\{x : x \text{ is a natural number and } x < 1\}$ is:

- (1) A singleton (2) The empty set (3) Infinite (4) Equal to $\{0\}$

27. If A' denotes the complement of A , then $A \cup A'$ equals:

- (1) $\emptyset$ (2) A (3) The universal set (4) A'

28. Two sets A and B are equal if:

- (1) They have the same number of elements (2) $A \subseteq B$ and $B \subseteq A$ (3) They are disjoint (4) $A \cap B$ is non-empty

Working space — Questions 21 to 28*Write the formula before you substitute.***Section D · Previous year questions — Straight from the AAI ATC papers**

Two questions from the 2023 morning paper, recovered by optical character recognition of the scanned answer sheets and independently checked.

29. Which of the following represents an empty set? **[PYQ 2023 · Morning]**

(1) Set of vowels in the word SYNCH (2) Set of months of a year starting with the letter A (3) Set of consonants in the word GIRLS (4) Set of prime numbers lesser than 10

30. Which of the following is NOT an element of the set of numbers belonging to the Fibonacci sequence? **[PYQ 2023 · Morning]**

(1) 34 (2) 13 (3) 7 (4) 89

Working space — Questions 29 to 30*Write the formula before you substitute.***Stuck on any of these? Bring them to a live class.**

Live online batches and 1-on-1 mentoring for AAI ATC Junior Executive — the full Class 11 and 12 physics and maths syllabus taught straight from the real question papers. Fees are kept deliberately low so any serious aspirant can join.

Enquiry form via aviatelearnings.com · Telegram: t.me/aaiatc2026kanishk · YouTube: youtube.com/@AAIATCEXamPrep