COMPETITIVE REASONING

Formula, Shortcut Tricks & Solved Examples

A simple exam-ready guide for SSC • Banking • Railway • UPSC CSAT • State PSC and other competitive examinations

10 Important Chapters	Concepts + Tricks + Solutions
Coding-Decoding • Number Series • Blood Relation • Direction Sense • Syllogism	Seating Arrangement • Ranking • Analogy • Calendar & Clock • Puzzle

Understand the rule. Learn the shortcut. Solve faster.

CHAPTER 1: CODING–DECODING

Coding-Decoding questions test how letters, numbers or words are changed according to a particular pattern.

Alphabet Positions

FORMULA / RULE

A=1, B=2, C=3, ... Z=26.
Reverse position = 27 − Actual Position.

Example: Find the reverse position of C.
Step-by-Step Solution:
C = 3. Reverse position = 27 − 3 = 24.
Final Answer: 24

Letter Shifting

SHORTCUT TRICK

Check forward movement, backward movement, alternate letters, reverse alphabet and position-based operations.

Example: If CAT is coded as DBU, how is DOG coded?
Step-by-Step Solution:
Each letter moves +1: D→E, O→P, G→H.
Final Answer: EPH

Common Coding Patterns

FORMULA / RULE

Forward shift: A→B→C
Backward shift: C→B→A
Reverse alphabet: A↔Z, B↔Y, C↔X
Position coding: A=1, B=2, ... Z=26

CHAPTER 2: NUMBER SERIES

Number Series questions require identifying the mathematical pattern between consecutive numbers.

Common Patterns

FORMULA / RULE

Addition: 2,5,8,11 (+3)
Subtraction: 50,45,40,35 (−5)
Multiplication: 2,4,8,16 (×2)
Mixed: 2,5,11,23 (×2+1)

Example: 2, 5, 11, 23, ?
Step-by-Step Solution:
Pattern is ×2+1. 23×2+1 = 47.
Final Answer: 47

Series Solving Order

SHORTCUT TRICK

Check in this order: Difference → Second Difference → Multiplication/Division → Alternating Pattern → Squares/Cubes → Prime Numbers.

Second Difference

Example: 2, 5, 10, 17, 26, ?
Step-by-Step Solution:
Differences are 3,5,7,9. Next difference = 11. Therefore 26+11 = 37.
Final Answer: 37

CHAPTER 3: BLOOD RELATION

Blood Relation questions test family relationships. The safest method is to draw a small family tree.

Important Relations

FORMULA / RULE

Father's father = Grandfather
Mother's mother = Grandmother
Father's brother = Uncle
Mother's brother = Maternal Uncle
Brother's son = Nephew
Sister's daughter = Niece

Family Tree Method

SHORTCUT TRICK

Translate one relationship at a time. Example: Mother's brother's son = Mother → Brother → Son = Cousin.

Example: A is the father of B. B is the sister of C. What is A to C?
Step-by-Step Solution:
If B is C's sister, A's relationship as B's father means A is also C's father.
Final Answer: Father

Generation Shortcut

FORMULA / RULE

Up one generation: Parent
Up two generations: Grandparent
Same generation: Brother/Sister/Cousin
Down one generation: Son/Daughter

CHAPTER 4: DIRECTION SENSE

Direction questions require tracking movement and finding the final direction or shortest distance.

Main Directions

FORMULA / RULE

North ↔ South
East ↔ West
North-East ↔ South-West
North-West ↔ South-East

Shortest Distance

FORMULA / RULE

For perpendicular movements: Shortest Distance = $\sqrt{(x^2+y^2)}$

Example: A person walks 3 km North and then 4 km East.
Step-by-Step Solution:
Distance = $\sqrt{(3^2+4^2)} = \sqrt{25} = 5$ km.
Final Answer: 5 km

Coordinate Trick

SHORTCUT TRICK

North = +Y, South = −Y, East = +X, West = −X. Use coordinates for long movement questions.

CHAPTER 5: SYLLOGISM

Syllogism questions are based on statements and conclusions. Venn diagrams make these questions easier.

Types of Statements

FORMULA / RULE

All A are B → A is inside B.
No A is B → A and B are separate.
Some A are B → A and B overlap.
Some A are not B → Some part of A lies outside B.

Basic Rule

SHORTCUT TRICK

Never assume information that is not given. Use only the statements.

Example: All pens are books. All books are papers. Conclusion: All pens are papers.
Step-by-Step Solution:
Pens are inside Books, and Books are inside Papers. Therefore Pens are inside Papers.
Final Answer: Conclusion follows

Venn Diagram Method

SHORTCUT TRICK

Draw circles for 'All', separate circles for 'No', and overlapping circles for 'Some'.

CHAPTER 6: SEATING ARRANGEMENT

Seating Arrangement questions require placing people according to given conditions.

Linear Arrangement

SHORTCUT TRICK

Draw seats in a row and place fixed positions first. Then place immediate neighbours.

Example: A is left of B and C is right of B.
Step-by-Step Solution:
The basic order is A-B-C.

Circular Arrangement

FORMULA / RULE

Facing the centre: Left = Clockwise; Right = Anticlockwise.
Facing outside: Left = Anticlockwise; Right = Clockwise.

SHORTCUT TRICK

Fix one person first to remove unnecessary rotations.

Solving Strategy

FORMULA / RULE

1. Draw seats.
2. Place fixed information.
3. Place neighbours.
4. Use remaining clues.
5. Verify every condition.

CHAPTER 7: RANKING

Ranking questions deal with positions from the top, bottom, left or right.

Total Number Formula

FORMULA / RULE

Total = Rank from Top + Rank from Bottom − 1

Example: A student ranks 7th from the top and 14th from the bottom.
Step-by-Step Solution:
Total = 7+14−1 = 20.
Final Answer: 20 students

Rank from the Other Side

FORMULA / RULE

Rank from Bottom = Total − Rank from Top + 1

Example: There are 50 students. A student is 12th from the top.
Step-by-Step Solution:
50−12+1 = 39.
Final Answer: 39th from the bottom

Quick Memory Trick

SHORTCUT TRICK

Top + Bottom − 1 = Total.

CHAPTER 8: ANALOGY

Analogy questions identify the relationship between two objects, words, numbers or letters.

Basic Format

FORMULA / RULE

A : B :: C : ?

Example: Doctor : Hospital :: Teacher : ?
Step-by-Step Solution:
A doctor works in a hospital. A teacher works in a school.
Final Answer: School

Number Analogy

Example: 2 : 4 :: 5 : ?
Step-by-Step Solution:
2×2 = 4. Apply the same relationship: 5×2 = 10.
Final Answer: 10

Letter Analogy

Example: A : C :: D : ?
Step-by-Step Solution:
A→C is +2. D→F is also +2.
Final Answer: F

Shortcut Trick

SHORTCUT TRICK

Ask: What is the exact relationship between the first pair? Apply the same relationship to the second pair.

CHAPTER 9: CALENDAR & CLOCK

Calendar questions involve odd days and leap years. Clock questions involve the angle between the hour and minute hands.

Odd Days

FORMULA / RULE

Odd days are the extra days after complete weeks.
7 days = 1 week.
365 days = 1 odd day.
366 days = 2 odd days.

Leap Year Rule

FORMULA / RULE

A year divisible by 4 is generally a leap year. Century years must be divisible by 400.
2024 = Leap year; 1900 = Not a leap year; 2000 = Leap year.

Clock Angle Formula

FORMULA / RULE

Angle = |30H − 11M/2|

Example: Find the angle at 3:00.
Step-by-Step Solution:
Angle = |30×3 − 11×0/2| = 90°.
Final Answer: 90°

Clock Shortcuts

SHORTCUT TRICK

3:00 = 90°; 6:00 = 180°; 9:00 = 90°; 12:00 = 0°.

CHAPTER 10: PUZZLE

Puzzles combine multiple reasoning concepts such as seating, scheduling, floors, grouping, distribution and selection.

Common Puzzle Types

FORMULA / RULE

Floor Puzzle • Box Puzzle • Scheduling Puzzle • Distribution Puzzle • Age Puzzle • Grouping Puzzle • Selection Puzzle

Puzzle-Solving Method

FORMULA / RULE

1. Read all conditions.
2. Identify fixed information.
3. Make a table.
4. Place definite information first.
5. Use elimination.
6. Verify every condition.

Table Method

SHORTCUT TRICK

Use a table with categories such as Person, Day, Place, Floor or Item. Put ✓ for confirmed information and × for impossible information.

Important Clue Words

FORMULA / RULE

Immediately before/after = adjacent position.
Exactly between = fixed distance.
Not next to = cannot be adjacent.
At least = minimum.
At most = maximum.

MASTER QUICK REVISION SHEET

Topic	Must-Remember Rule / Shortcut
Coding-Decoding	A=1 to Z=26; Reverse position = 27−Actual Position
Number Series	Check difference first, then multiplication/division and special patterns
Blood Relation	Draw a family tree and solve one relationship at a time
Direction Sense	Use coordinates; shortest distance = $\sqrt{(x^2+y^2)}$
Syllogism	Use Venn diagrams; never assume extra information
Seating Arrangement	Fix one person first in circular arrangements
Ranking	Total = Top Rank + Bottom Rank − 1
Analogy	Find the exact relationship in the first pair
Calendar	Ordinary year = 365 days; Leap year = 366 days
Clock	Angle = $\lvert 30H - 11M/2 \rvert$
Puzzle	Make a table, place fixed clues first and verify all conditions

Practice regularly. First understand the rule, then learn the shortcut, and finally solve questions under time pressure.