CODING–DECODING

ALL MAJOR TYPES + FAST TRICKS + SOLVING FRAMEWORK

1. MASTER APPROACH: DECODE BEFORE YOU CALCULATE

Step	What to do	Fast check
1	Write A=1 to Z=26.	Keep the alphabet table ready.
2	Compare original and coded symbols.	Check shift, mirror, arithmetic.
3	Test the simplest rule first.	Try +/– shift → reverse → arithmetic.
4	Check position-wise behavior.	Separate 1st, 2nd, 3rd positions.
5	For sentences, find repeated words/codes.	Common word = common code.
6	For number strings, split only when justified.	Test both chunks and digit-wise mapping.
7	Verify on every given example.	Reject rules that fit only one pair.

GOLDEN RULE A correct coding rule should explain every given coding pair, not just one example.

2. ALPHABET POSITION CODING

Letter	A	B	C	D	E	F	G	H	I	J	K	L	M
Position	1	2	3	4	5	6	7	8	9	10	11	12	13

Letter	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Position	14	15	16	17	18	19	20	21	22	23	24	25	26

EXAMPLE:
CAT → 3-1-20.

If values are concatenated, check whether 10, 11, ... 26 create variable-length chunks.

TRICK Memorize anchors: A1, E5, J10, M13, N14, R18, T20, Z26.

3. SHIFT CODING (+n / –n)

Rule	Example	Method
+1	A → B, D → E	Add 1
+2	A → C, D → F	Add 2
–1	D → C, H → G	Subtract 1
–2	D → B, H → F	Subtract 2
Wrap-around	Z → A under +1	Restart after Z

EXAMPLE (Supplied):
DELHI → 5613910
(Each letter position +1)
D(4), E(5), L(12), H(8), I(9) → 5,6,13,9,10

TRICK Test +1 and –1 first; they are among the most common rules.

4. REVERSE ALPHABET / OPPOSITE LETTER CODING

Normal	Reverse	Normal	Reverse
A	Z	N	M
B	Y	O	L
C	X	P	K
D	W	Q	J
E	V	R	I
F	U	S	H
G	T	T	G
H	S	U	F
I	R	V	E
J	Q	W	D
K	P	X	C
L	O	Y	B
M	N	Z	A

- Formula: reverse position = 27 – original position.
- Example: T = 20 → 27 – 20 = 7 → G

EXAMPLES (Supplied):
- PEAK → KVZP
- FOUR → ULFI
- THIS → GSRH

TRICK Memorize mirror pairs: AZ, BY, CX, DW, EV, FU, GT, HS, IR, JQ, KP, LO, MN.

QUICK TIP When stuck, write positions, test simple rules, and look for patterns in every position.
Practice more → Decode faster!

5 NUMBER → LETTER REVERSE CODING

Number	1	2	3	4	5	6	7	8	9	10
Code	Z	Y	X	W	V	U	T	S	R	Q

FORMULA

Code letter position = 27 − number.

EXAMPLE (Supplied)

125 → VYZ
because 1→Z, 2→Y, 5→V.

369 → XUR
because 3→X, 6→U, 9→R.

TRICK

Digit-wise coding means each digit is handled independently.

6 POSITION-WISE / MULTIPLE-RULE CODING

When each position follows a different movement, analyze columns independently.

Position	Observed pattern	Shift	Next
1st	A → C → E	+2	G
2nd	L → J → H	−2	F
3rd	Y → W → U	−2	S

EXAMPLE (Supplied)

ALY, CJW, EHU → GFS

ALY	CJW	EHU	
A	C	E	A → C → E (+2) → G
L	J	H	L → J → H (−2) → F
Y	W	U	Y → W → U (−2) → S

TRICK Turn the series vertically into columns. The rule usually becomes obvious.

7 LETTER-SERIES CODING

Column	Observed	Rule	Next
1st	B → E → H	+3	K
2nd	F → L → R	+6	X
3rd	D → G → J	+3	M

EXAMPLE (Supplied)

BFD, ELG, HRJ → KXM

BFD	ELG	HRJ	
B	E	H	B → E → H (+3) → K
F	L	R	F → L → R (+6) → X
D	G	J	D → G → J (+3) → M

TRICK Convert letters to numbers before looking for a series.

B=2, E=5, H=8 → +3
F=6, L=12, R=18 → +6

8 WORD-TO-CODE / DIRECT SUBSTITUTION

- A fixed word normally keeps the same code wherever it appears.
- Supplied example: in the sentence sets, "walking" appears with code AG in two places.

EXAMPLE (Supplied)

Sentence	Code
1. Arjun is walking to school	NA SI AG DR VI
2. Krishna is speaking to Arjun	KA TK DR SI NA
3. School is within walking distance of Krishna	VI SI NIH AG LE KA OP

TRICK Repeated word = repeated code.
Start with repetitions rather than decoding every word.

9 SENTENCE CODING USING COMMON WORDS

Observation	Inference
One repeated word	Find the one repeated code.
Two repeated words	Find the two common codes.
Several repeated words	Match by elimination and order.
No obvious repeat	Use frequency/order and remaining-code elimination.

1. Compare two sentences.
2. Underline common words.
3. Circle common codes.
4. Match common word(s) with common code(s).

TRICK

Choose the pair of sentences with the most overlap first.

EXAMPLE (Supplied)

1. Arjun is walking to school — NA SI AG DR VI
2. Krishna is speaking to Arjun — KA TK DR SI NA
3. School is within walking distance of Krishna — VI SI NIH AG LE KA OP

How it works:

- Common word "is" appears in all three ⇒ code SI (common).
- Common word "Arjun" appears in sentences 1 and 2 ⇒ code NA (common).
- Common word "walking" appears in sentences 1 and 3 ⇒ code AG (common).

Thus, AG is the code for "walking".

10 PAIRWISE WORD ↔ NUMBER CODING

Supplied example:

Phrase	Code
Sweet and hot	617
Coffee is sweet	735
Tea is hot	263

Therefore **Coffee is hot → 536.**

Word	Code	Reason
hot	6	Common to 617 and 263
sweet	7	Common to 617 and 735
is	3	Common to 735 and 263
tea	2	Remaining code in 263
and	1	Remaining code in 617
coffee	5	Remaining code in 735

TRICK

Use **INTERSECTION first, then ELIMINATION.**

How to solve:

1. Compare codes pairwise.
2. Find common codes.
3. Assign the common words.
4. Use remaining codes by elimination.

11 NUMERICAL CODING BY ARITHMETIC OPERATION

- Supplied example: **CHAIR → 61621836**; each alphabet position is **multiplied by 2.**
- C=3→6, H=8→16, A=1→2, I=9→18, R=18→36.
- The same rule gives **TABLE → 40242410** and **SOFASET → 3830122381040.**

Operation to test	When to test
×2 / ×3	Code values are larger than 26 and proportional.
+n / −n	Code remains near the original value.
Square	Values grow rapidly.
Position-based	Different positions show different multipliers.

TRICK

Large even code chunks are a strong clue for multiplication by 2 or another constant.

EXAMPLE (Supplied)

CHAIR → 61621836

C	H	A	I	R
3	8	1	9	18
↓	↓	↓	↓	↓
×2	×2	×2	×2	×2
6	16	2	18	36

TABLE → 40242410

T	A	B	L	E
20	1	2	12	5
↓	↓	↓	↓	↓
×2	×2	×2	×2	×2
40	2	4	24	10

SOFASET → 3830122381040

S	O	F	A	S	E	T
19	15	6	1	19	5	20
↓	↓	↓	↓	↓	↓	↓
×2	×2	×2	×2	×2	×2	×2
38	30	12	2	38	10	40

12 DIFFERENCE OF SQUARES / PAIR ARITHMETIC

- Supplied example: **AC → $3^2 - 1^2 = 8$.**

How AC works:

A = 1, C = 3

$b^2 - a^2 = 3^2 - 1^2$

$= 9 - 1 = 8$

Candidate rule	Formula
Difference	$\|a - b\|$
Sum	$a + b$
Product	$a \times b$
Difference of squares	$b^2 - a^2$
Square of difference	$(b - a)^2$

TRICK

If the code is much larger than either letter position, test square/ product operations.

13 MIXED / ALPHANUMERIC CODING

Output clue		Likely test
A1	Letter → one number	A=1…Z=26; then shift/operation
A→B	Letter → letter	Shift or reverse alphabet
7→A	Digit → letter	Normal/reverse alphabet
12345	Large numeric string	Concatenation of transformed values
A1B22	Different output length	Variable-length chunks or word-level coding

IMPORTANT: Always establish whether each input character has one code unit or multiple digits.

EXAMPLE (Supplied)

- **DELHI → 5613910**
  (A=1…Z=26; then +1 to each position)
  D=4→5, E=5→6, L=12→13,
  H=8→9, I=9→10
- **125 → VYZ**
  (Reverse alphabet: 1→Z, 2→Y, 5→V)
- **369 → XUR**
  (3→X, 6→U, 9→R)

14 REARRANGEMENT / POSITION CODING

Pattern	Example
Reverse	ABCDE → EDCBA
Adjacent swap	ABCDE → BADCE
First-last swap	ABCDE → EBCDA
Odd positions first	ABCDE → ACEBD

TRICK

If the same letters appear in the output, but in a new order, test rearrangement before substitution.

EXAMPLE

WORD: SCHOOL
Reverse → LOOHCS
Adjacent swap → SHCOOL
First-last swap → LCHOOS
Odd positions first → SCOHOL

15 ODD-EVEN / ALTERNATING CODING

- Odd positions and even positions may follow **different rules.**

EXAMPLE

WORD: PATTERN
Rule: Odd (+1), Even (−1)

Positions:	1	2	3	4	5	5	7
Letters:	P	A	T	T	E	R	N
	↓	↓	↓	↓	↓	↓	↓
Transformed:	Q	Z	U	S	G	F	O

STEPS

1. Number positions 1, 2, 3, 4…
2. Separate odd and even positions.
3. Find the rule in each group.
4. Recombine the transformed characters.

TRICK

If a rule works on every second character, suspect odd-even coding.

16 INCREASING / DECREASING SHIFT CODING

- The shift itself may change: +1, +2, +3… or −1, −2, −3…

EXAMPLE

WORD: CODE
Shift Pattern: +1, +2, +3, +4

Original:	C	O	D	E
	↓	↓	↓	↓
Shift:	+1	+2	+3	+4
Result:	D	Q	G	I

Position	Possible shift
1st	+1
2nd	+2
3rd	+3
4th	+4

TRICK

Write original and coded positions underneath each other and calculate the shift sequence.

Original:	C	O	D	E
	↓	↓	↓	↓
Coded:	D	Q	G	I
Shift:	+1	+2	+3	+4

17 WHOLE-WORD AGGREGATE CODING

- If one whole word maps to one number, test aggregate properties.

Feature	Example for CAT
Sum	3 + 1 + 20 = 24
Product	3 × 1 × 20 = 60
First + last	3 + 20 = 23
First × last	3 × 20 = 60
Length	3

EXAMPLE

WORD: CAT
A = 1, C = 3, T = 20
Sum → 24
Product → 60
First + last → 23
Length → 3

TRICK

One-word → one-number codes are more likely to use a word-level property than simple concatenation.

18 WORD REVERSAL / ORDER CODING

- A sentence may use the same word codes but change their order.
- Compare the sequence of repeated words before assuming a new substitution rule.
- If identity is preserved but order changes, treat it as an arrangement problem.

EXAMPLE (Supplied style)

Sentence 1:

Arjun is walking to school

NA	SI	AG	DR	VI
↓	↓	↓	↓	↓
Arjun	is	walking	to	school

Sentence 2:

School to Arjun is walking

VI	DR	NA	SI	AG
↓	↓	↓	↓	↓
school	to	Arjun	is	walking

Same codes (same identity of words), but the order of words changed. This is **ORDER CODING,** not a new substitution rule.

19 FAST ELIMINATION TABLE

Question clue		First test	Example / What to do
A B C	Only letters in code	Shift / reverse / substitution	Try +1, −1, reverse alphabet, or fixed substitution.
1 2 3	Numbers ≤ 26	Alphabet positions	Check if numbers match A=1…Z=26 or shifted positions.
2 4 6	Large even chunks	× 2 or another multiplier	Divide by 2 and see if it matches alphabet positions.
A + A	Repeated words	Repeated codes	Common word = common code.
1 2 1	Repeated numbers	Common words	Same number usually means same word.
= = =	Same input/output length	Character-wise transformation	Each letter/number gets one code unit.
↑ ↓	Output length changes	Concatenation or aggregate rule	May be value concatenation, sum, product, word-level coding, etc.
A ↔ Z	Mirror-like letters	27 − n	Check if positions add up to 27.
▮ ▪ ▮	Series of groups	Column-wise analysis	Write in columns and find pattern in each position.

20 ONE-PAGE FORMULA SHEET

Concept		Formula / shortcut	Example
A Z	Alphabet position	A = 1, B = 2, … Z = 26	CAT → 3, 1, 20
A ↔ Z	Reverse alphabet	A ↔ Z, B ↔ Y, … M ↔ N	T(20) → G(7)
27−n	Mirror position	27 − n	T = 20 → 27 − 20 = 7 → G
→	Forward shift	n + k	D(4) + 2 = 6 → F
←	Backward shift	n − k	H(8) − 3 = 5 → E
Σ	Sum coding	Σ letter positions	CAT → 3 + 1 + 20 = 24
Π	Product coding	Π letter positions	CAT → 3 × 1 × 20 = 60
|a − b|	Difference	|a − b|	H(8), D(4) → |8 − 4| = 4
$b^2 - a^2$	Difference of squares	$b^2 - a^2$	AC → $3^2 - 1^2 = 9 - 1 = 8$
2n	Double coding	2n	R(18) → 36
L	Word length	Number of letters	TABLE → 5 letters
🤝	Sentence coding	Common word ↔ common code	Common word "is" → same code
📊	Series coding	Analyze each position separately	ALY, CJW, EHU → GFS (see column-wise rule)

Attempt Quiz Click Here