Coded Equations

~ Reasoning · SSC Exams ~

← circled = key tricks!

In a **coded equation**, the usual signs (+,−,×,÷) or numbers are secretly swapped for other symbols, letters or numbers. Your job: decode every symbol back to its real meaning first, then solve with strict **BODMAS** — never solve in the order symbols appear on paper!

① BODMAS — the Golden Order

Brackets → **Of** (powers) → **Division** → **Multiplication** → **Addition** → **Subtraction**.

÷ and × are equal priority — solve **left to right**. Then + and − — solve **left to right**.

3-step method — **Step 1** decode every coded sign to its real meaning. **Step 2** rewrite the whole expression with real signs. **Step 3** apply BODMAS strictly.

Worked example — decode, then BODMAS

If **+** means −, **−** means ×, **×** means ÷, **÷** means +, find: 12 + 6 − 4 × 8 ÷ 2

Step 1 — decode: + → −, − → ×, × → ÷, ÷ → +.

Step 2 — rewrite: 12 − 6 × 4 ÷ 8 + 2

Step 3 — BODMAS: 6×4=24, 24÷8=3 ∴ 12−3+2

Answer → 12−3+2 = **11**. ✅

✓ This notebook covers **every SSC coded-equation type**: letter/symbol substitution, sign interchange, number interchange, equation balancing, correct-the-equation & coded inequalities — each with a solved example.

Trap → decode ALL signs in **ONE pass** before calculating anything. Decode-then-compute one sign at a time and you'll mix old & new meanings — and get it wrong!

② Letter & Symbol Substitution

Rule

SSC often hides +,−,×,÷ behind **letters** (A,B,C,D) or **symbols** (@,#,%,$). Build the substitution table first, decode the **whole** expression, then compute.

Real Sign	Letter Code	Symbol Code
+	A	@
−	B	#
×	C	%
÷	D	$

Worked example — letter code

If A=+, B=−, C=×, D=÷, evaluate: 18 C 3 A 6 D 2 B 4

Step 1 — decode: 18 × 3 + 6 ÷ 2 − 4

Step 2 — BODMAS: 6÷2=3, 18×3=54 ∴ 54+3−4

Answer → 54+3−4 = **53**. ✅

Try this — symbol code

If @=+, #=−, %=×, $=÷, evaluate: 20 % 2 @ 15 $ 3 # 5

Decode: 20 × 2 + 15 ÷ 3 − 5 → 40+5−5 = **40**. ✅

Quick decode drills

- 9 A 3 C 2 = 9+6=**15**
- 16 D 4 B 1 = 4−1=**3**
- 7 % 2 $ 2 = 14÷2=**7**
- 30 # 6 @ 4 = 24+4=**28**

Trap → the coded letters/symbols are **not** always in A=+,B=−… order — some papers reverse or shuffle them. Always check the key given **in that question**.

③ Full 4-Sign Swap — Evaluate ⇄

Rule

Here all **four** operators are swapped at once (e.g. "+ means ×, × means −, − means ÷, ÷ means +"). Brackets keep their normal meaning — only +,−,×,÷ change. Decode every occurrence first, then apply BODMAS.

Worked example (real SSC pattern)

If + means ×, × means −, − means ÷, ÷ means +, find: $45 - 9 + 2 \div 10 \times 3$

Step 1 — decode: + →×, ×→−, −→÷, ÷→+.

Step 2 — rewrite: $45 \div 9 \times 2 + 10 - 3$

Step 3 — BODMAS: $45\div9=5$, $5\times2=10$ ∴ $10+10-3$

Answer → $10+10-3 = 17$. ✅

Try this — different swap-cycle

If + means ÷, ÷ means ×, × means −, − means +, find: $8 \div 3 - 12 + 4 \times 2$

Decode: $8\times3 + 12\div4 - 2 \rightarrow 24 + 3 - 2 = 25$. ✅

Quick 2-sign swap checks

+↔−: $10+4-2 \rightarrow 10-4+2=$**8**

×↔÷: $20\times4\div2 \rightarrow 20\div4\times2=$**10**

Order matters — decode **first**, then compute. Never compute left-to-right while decoding sign by sign, or you'll apply mismatched rules.

✓ Write the decode arrows above each symbol in the expression itself — it stops you slipping back into the old meaning mid-way.

④ Interchange of Two Signs ⇄

Rule

The given equation is **wrong as written**. Exactly one **pair of signs** must be swapped (every place that sign occurs) to make LHS = RHS. For MCQs, test each option's pair by substituting and re-applying BODMAS.

Worked example (real SSC pattern)

Which two signs should be interchanged to make the equation correct? $6 + 2 \times 8 - 4 = 16$

(1) + & − (2) + & × (3) × & ÷ (4) − & ÷

Step 1 — as given: $6+2\times8-4 = 6+16-4 = 18 \neq 16$ (wrong).

Step 2 — test option (2), swap + & ×: $6\times2+8-4 = 12+8-4 = 16$ = RHS ✓

Answer → Option (2) — interchange **+ and ×**. ✅

Try this

$12 - 4 \times 3 = 45$. Which two signs should be interchanged?

As given: $12-12 = 0 \neq 45$. Swap − & ×: $12\times4-3 = 48-3 =$ **45**. ✅ Answer → − and ×.

Common sign-pairs to test first

+ & −	+ & ×	× & ÷
− & ÷	+ & ÷	− & ×

💡 Swap **every** occurrence of that sign in the equation, not just one. Then recompute the **whole** expression with BODMAS — don't just eyeball it!

⑤ Interchange of Two Numbers ⇄

Rule

Same idea, but now two **numbers** swap places (the signs stay exactly where they are). Substitute the swap and recompute with BODMAS to check LHS = RHS.

Worked example

Which two numbers should be interchanged to make correct? $3 \times 5 + 8 - 2 = 9$

Step 1 — as given: $3\times5+8-2 = 15+8-2 = 21 \neq 9$.

Step 2 — test swap 5 & 2: $3\times2+8-5 = 6+8-5 = 9$ = RHS ✓

Answer → interchange **5 and 2**. ✅

Try this

$4 + 3 \times 9 - 6 = 55$. Which two numbers should be interchanged?

As given: $4+27-6 = 25 \neq 55$. Swap 3 & 6: $4+6\times9-3 = 4+54-3 =$ **55**. ✅ Answer → 3 and 6.

Quick drills

$7\times2+9-3=28$ → swap **2,3**

$10-5\times4+1=11$ → swap **5,1**

✓ Some SSC papers ask you to interchange **one number AND one sign together** — the method is identical: substitute both, then recompute the whole expression.

Trap → don't confuse "interchange numbers" with "interchange signs". Read the question word-for-word before you start testing options.

⑥ Balancing the Equation ⚖

Rule

Blanks in the equation need signs, and each option gives a set of signs **in order**. Substitute an option into the blanks left-to-right, apply BODMAS, check LHS = RHS — reject as soon as it doesn't match.

Worked example

6 _ 3 _ 12 _ 4 = 21. Choose the correct signs (in order):

(1) +,×,÷ (2) ×,+,÷ (3) ×,÷,+ (4) +,÷,×

Step 1 — test (2): $6\times3+12\div4 = 18+3 = 21$ = RHS ✓

Answer → Option (2) — **×, +, ÷**. ✅

Try this

20 _ 5 _ 3 _ 6 = 22. (1) ÷,+,× (2) +,×,÷ (3) ×,÷,+ (4) −,+,×

Test (1): $20\div5+3\times6 = 4+18 =$ **22**. ✅ Answer → option (1).

Shortcut

If an option's arithmetic would give a fraction/decimal but the RHS is a whole number, **eliminate it immediately** — test the "clean-division" options first to save time.

Trap → the blanks must be filled **in the exact order** the option lists them — don't rearrange the signs to whatever "feels right."

⑦ Correct the Equation ○○⊗

Rule

You're given **one** decode key and **four** equations. Decode each option with that same key and check which one balances (LHS = RHS). Only one will actually work.

Worked example

If + means −, × means ÷, − means ×, ÷ means +, which of these is correct?

(1) 8+2×3=13   (2) 10−3÷2=32   (3) 6×3+2=20   (4) 12÷4−3=5

Step 1 — decode option (2): −→×, ÷→+ ∴ 10×3+2 = 30+2 = 32 = RHS ✓

Answer → Option **(2)** is correct. ✅ (the rest fail the same test — verify similarly.)

Try this — true/false check

If + means ×, × means +, is "5 + 3 × 2 = 13" correctly coded?

Decode: 5×3+2 = 15+2 = 17 ≠ 13. **No** — the correct value is 17, not 13. ✅

Speed tip

Decode only the **operators actually used** in each option before computing — don't waste time decoding signs that don't appear in that particular equation.

Trap ⟶ decode **ALL** operators in that option before computing — a half-decoded equation looks "close" to right but is still wrong.

⑧ Coded Inequalities — the Basics >

Rule

Relation signs >, <, =, ≥, ≤ are hidden behind symbols. Decode the **whole** statement into a chain of real relations, then read it left to right.

Symbol	Meaning	Symbol	Meaning
@	> (greater than)	$	≥ (greater / equal)
#	< (less than)	&	≤ (less / equal)
%		= (equal to)	

Worked example

Decode and check: 15 @ 9 $ 9 # 20 — is this statement true?

Step 1 — decode: 15 > 9 ≥ 9 < 20

Step 2 — check each link: 15>9 ✓, 9≥9 ✓, 9<20 ✓.

Answer → every link holds, so the statement is **True**. ✅

Quick decode-and-check drills

- 12 # 8 → 12<8 → **False**
- 7 % 7 → 7=7 → **True**
- 20 $ 15 → 20≥15 → **True**

Trap → coded inequality symbols are deliberately non-intuitive (@ might not mean >!). Always use the key given **in that specific question**, never a previous one.

⑨ Coded Inequalities – Conclusions ≥

Combine rule

$>+>=>$ · $\geq+\geq=\geq$ · $>+\geq$ (either order) $=>$ · $<+<=<$ · $\leq+\leq=\leq$ · $<+\leq=<$. A **direction reversal** ($>$ then $<$, or $<$ then $>$) breaks the chain — no relation can be found between the end terms.

Example 1 – chain combines

@=>, \$=≥. Statement: A @ B \$ C. Conclusions: I. $A>C$ II. $A\leq C$

Step — chain: $A>B\geq C$ → combine ($>$ wins over $\geq$) → $A>C$ is certain.

Answer → **Only conclusion I follows.** ✅

Example 2 – either/or

\$=≥. Statement: X \$ Y. Conclusions: I. $X>Y$ II. $X=Y$

Step — $X\geq Y$ means X is greater than OR equal to Y — we just don't know which.

Answer → **Either I or II follows.** ✅

Example 3 – direction reversal

@=>, #=<. Statement: P @ Q # R. Conclusions: I. $P>R$ II. $P<R$

Step — chain: $P>Q<R$ — direction flips at Q, so P vs R is undefined.

Answer → **Neither I nor II follows.** ✅

💡 Trap → $\geq$ and $\leq$ are **not** the same as $>$ and $<$. Two non-strict signs combine to a non-strict result; a strict sign anywhere in the chain makes the result strict.

How to Attack ANY Coded Question

1→ Write down the substitution key first (letters/symbols → real signs) before touching any numbers.

2→ Decode the **entire** expression/equation in one pass — don't compute while decoding.

3→ Apply strict **BODMAS**: Brackets → Of (powers) → Division/Multiplication (left to right) → Addition/Subtraction (left to right).

4→ For interchange & balancing Qs, test the swap/option in the **actual** equation and recompute fully — never eyeball it.

5→ For coded inequalities, decode the whole chain first; combine only same-direction relations — a reversal breaks the chain.

Common traps → decoding mid-calculation instead of upfront; assuming standard symbol meanings carry over from another question; forgetting negative results; and mixing up ≥/≤ with >/<.

Quick Pattern Gallery — one-glance revision

BODMAS: Brackets→Of→Div→Mul→Add→Sub	**Symbol swap:** decode ALL first, then solve
Sign interchange: swap & recompute fully	**Number interchange:** swap numbers, signs stay
Balancing: test each option's full set	**Correct-the-eqn:** decode each option, find match
Inequality decode: @,#,%,$,& → >,<,=,≥,≤	**Combine:** >+≥=>; ≥+≥=≥; reversal = no relation
Either/Or: X≥Y → I:X>Y II:X=Y both possible	**Trap:** standard symbol meaning ≠ coded meaning

Exercise – Crack the Code

Real SSC-pattern questions — solve, then check the Answer Key on the next page.

Q1. If + means ÷, − means ×, × means +, ÷ means −, find: 12 + 3 − 4 × 6 ÷ 2
(1) 18 (2) 20 (3) 16 (4) 22

Q2. If A=+, B=−, C=×, D=÷, evaluate: 24 D 4 C 3 A 5 B 2
(1) 19 (2) 23 (3) 21 (4) 25

Q3. If @=+, #=−, %=×, $=÷, evaluate: 18 % 2 $ 4 @ 6 # 3
(1) 12 (2) 14 (3) 10 (4) 15

Q4. Which two signs interchanged make correct? 9 × 3 + 6 − 2 = 25
(1) + & − (2) × & + (3) × & ÷ (4) − & ÷

Q5. Which two numbers interchanged make correct? 6 × 4 + 9 − 3 = 23
(1) 6&9 (2) 4&3 (3) 9&3 (4) 6&4

Q6. 16 _ 4 _ 9 = 13. Choose signs (in order):
(1) ×,− (2) ÷,+ (3) −,× (4) +,÷

Q7. If + means −, × means ÷, − means ×, ÷ means +, which is correct?
(1) 8+2×3=13 (2) 10−3÷2=32 (3) 6×3+2=20 (4) 12÷4−3=5

Q8. If @=>, #=<, %==, decode: 12 @ 8 % 8 # 15 — is it true?
(1) True (2) False (3) Can't say (4) None

Q9. P @ Q # R (@=>, #=<). Concl: I. P>R II. P<R
(1) Only I (2) Only II (3) Neither (4) Either

Q10. X $ Y, Y @ Z ($=≥, @=>). Concl: X>Z?
(1) True (2) False (3) Can't say (4) Only if X=Y

Q11. M $ N ($=≥). Concl: I. M>N II. M=N
(1) Only I (2) Only II (3) Either (4) Neither

Q12. Which two numbers interchanged? 5 + 6 × 2 − 4 = 27
(1) 6&4 (2) 2&4 (3) 5&6 (4) 5&4

✓ *Solve every question on paper first — write the decode/chain under each expression — then flip the page to check.*

✅ Answer Key

Q1 → 20 — decode: $12 \div 3 \times 4 + 6 - 2 = 4 \times 4 + 6 - 2 = 16 + 6 - 2 = \mathbf{20}$.

Q2 → 21 — decode: $24 \div 4 \times 3 + 5 - 2 = 6 \times 3 + 5 - 2 = 18 + 5 - 2 = \mathbf{21}$.

Q3 → 12 — decode: $18 \times 2 \div 4 + 6 - 3 = 36 \div 4 + 6 - 3 = 9 + 6 - 3 = \mathbf{12}$.

Q4 → option (2) — swap ×&+: $9 + 3 \times 6 - 2 = 9 + 18 - 2 = \mathbf{25}$ = RHS.

Q5 → option (2) — swap 4&3: $6 \times 3 + 9 - 4 = 18 + 9 - 4 = \mathbf{23}$ = RHS.

Q6 → option (2) — ÷,+: $16 \div 4 + 9 = 4 + 9 = \mathbf{13}$ = RHS.

Q7 → option (2) — decode −&÷: $10 \times 3 + 2 = 30 + 2 = \mathbf{32}$ = RHS.

Q8 → True — decode: $12 > 8 = 8 < 15$, all three links hold.

Q9 → Neither — chain $P > Q < R$ reverses direction at Q; P vs R undefined.

Q10 → True — chain $X \geq Y > Z$ combines to $X > Z$ (strict sign wins).

Q11 → Either I or II — $M \geq N$ means $M > N$ or $M = N$, exactly one is true.

Q12 → option (2) — swap 2&4: $5 + 6 \times 4 - 2 = 5 + 24 - 2 = \mathbf{27}$ = RHS.

Score yourself

10–12 correct → **excellent**, coded equations are your strength! 6–9 → **good**, revisit pages 2–9.
Below 6 → **redo** the "How to Attack" steps on page 10 slowly.

☆ *Decode it right, crack every equation!* ☆

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