Missing Number

~ Reasoning · SSC Exams ~

← circled = key tricks!

Every figure (grid, circle, triangle) hides **one arithmetic rule**. Your only job is to test one relation across ALL given figures before trusting it — that's the whole chapter.

① What Is a Missing Number Series?

- Numbers are arranged in a **figure** — a 3×3 box, a circle with spokes, a triangle, or a small table.
- One cell/position is replaced by **?**. A hidden **rule** (add, subtract, ×, ÷, square, cube...) links the given numbers to it.
- Usually **2–3 figures** follow the SAME rule — use the complete ones to crack the rule, then apply it to the incomplete one.

The Golden Method — 4 steps

❶ **Scan** the figure — is it row-based, column-based, diagonal, or all-numbers-together?

❷ **Guess** a relation using the simplest complete row/figure (start with +, then ×, then mixed).

❸ **Confirm** the SAME relation on a second row/figure — if it fails, guess again.

❹ **Apply** the confirmed relation to the incomplete row/figure to get ?.

4	5	9
3	6	9
2	7	?

Worked example

Step 1 — Row1: 4+5=9. Row2: 3+6=9. Same relation (col1+col2=col3)!

Step 2 — confirmed on 2 rows, so apply to Row3: 2+7.

Answer → ? = **9**. ✅

Operations to ALWAYS have ready

- Add / Subtract
- Multiply / Divide
- Square / Cube
- × then ± constant
- Sum of squares
- Mixed 2-step rules

Never lock onto a rule from just ONE row/figure — small numbers coincidentally fit many rules. Always double-check.

② 3×3 Matrices – Row Rule

The most common figure. First test if the rule runs **along each row** (left→right).

2	3	6
4	2	8
5	3	?

Worked example – multiply row

Step 1 — Row1: 2×3=6. Row2: 4×2=8. Rule: col1×col2=col3.

Step 2 — confirmed on 2 rows → apply to Row3: 5×3.

Answer → ? = **15**. ✅

2	3	10
5	2	14
6	4	?

Mixed 2-step rule

Row1: (2+3)×2=10. Row2: (5+2)×2=14 ✓.

Row3: (6+4)×2 = **20**. Two-step rules (add THEN multiply) are very common — don't stop at the first operation.

Try these – rule: col1 – col2 = col3

· 9,4,5 · 12,5,7 · 20,8,? → 9−4=5 ✓, 12−5=7 ✓ ∴ ? = 20−8 = **12**.

Order of the row matters! col1−col2 ≠ col2−col1. Always keep the **same left-to-right direction** across all rows.

✓ Order to try: **add** ⟶ **multiply** ⟶ **add-then-multiply** ⟶ **subtract**. Most SSC papers use one of these four first.

③ 3×3 — Column & Diagonal Rule

*If NO row-rule fits, test **columns** (top↓bottom) next, then the two **diagonals**.*

2	5	9
3	4	6
5	9	?

Worked example — column rule

Step 1 — Col1: 2+3=5 (top+mid=bottom). Col2: 5+4=9 ✓.

Step 2 — apply to Col3: 9+6.

Answer → ? = **15**. ✅

5	3	9
6	8	4
7	2	?

Worked example — diagonal rule

Step 1 — anti-diagonal (marked) 9+8+7 = 24.

Step 2 — main diagonal must equal it: 5+8+? = 24.

Answer → ? = **11**. The other 4 numbers (3,6,4,2) are decoys! ✅

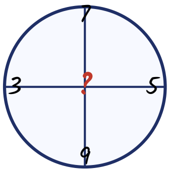
Checklist — in this order

1. Row rule (each row same relation)
2. Column rule (each column same relation)
3. Main diagonal = Anti-diagonal
4. All 9 numbers together (sum/product)

A grid with many "unused" looking numbers is often a diagonal-rule trap — the rule only touches 5 of the 9 cells.

④ Circles – Sum & Product

Numbers sit at N/E/S/W (or 3 points) around the circle; the **centre** is built from all of them.

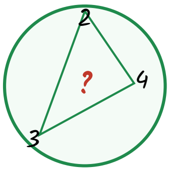


Worked example – centre = sum of outer 4

Step 1 — N+E+S+W = 7+5+9+3.

Step 2 — add: 7+5=12, 9+3=12, total 24.

Answer → centre = **24**. ✓



Product-type circle

Rule: centre = product of the 3 outer numbers.

2 × 3 × 4 = **24**.

Try these – product circle, one outer missing

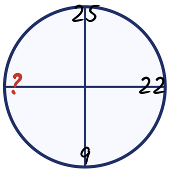
- Outer 5, 2, ? · centre 40 → 5×2×? = 40 ∴ ? = **4**.

Test SUM before PRODUCT – sum is far more common in SSC circles. Only try product if sum clearly fails.

A circle with 4 spokes usually adds; a circle with only 3 numbers around it usually multiplies (fewer numbers ⇒ product stays manageable).

⑤ Circles – Difference & Combined Ops

Beyond plain sum/product, SSC loves **opposite-pair differences** and **2-step (× then −)** rules.

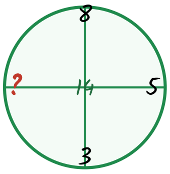


Worked example — opposite difference equal

Given figure (confirmed): N=20, S=8, E=17, W=5 → |20−8| = |17−5| = 12.

Step — here N=25, S=9 → diff = 16, so |22−W| = 16.

Answer → W = **6**. ✅



Two-step rule: centre = (N×S) − (E×W)

Confirmed elsewhere: N=6,S=5,E=4,W=3 → 30−12=18.

Here N=8,S=3=24; centre=14 → 24−5W=14 → W = **2**.

Try these

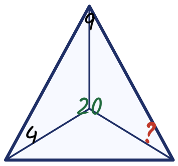
- Rule N−S=E−W: N=30,S=12(diff18); E=25,W=? → ? = 25−18 = **7**.

Fix the subtraction order first (e.g. always N−S, never S−N) using the COMPLETE figure, then reuse that exact order everywhere.

If a plain sum/product doesn't fit ANY pair, immediately suspect a 2-step rule — multiply one pair, subtract the other product.

⑥ Triangles – Corners → Centre △

Three corner numbers combine (via a fixed rule) to give the **centre** number.

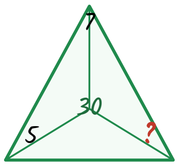


Worked example – centre = sum of corners

Step 1 — other triangles confirm: 5+6+7=18 = centre.

Step 2 — here: 9+4+? = 20.

Answer → ? = **7**. ✅



Mixed rule: centre = (top×bottom-left) – corner

Confirmed: 6×5−2=28. Here 7×5−?=30 → 35−?=30 → ? = **5**.

Try these – sum-of-squares centre

- Corners 3,4,5; centre = $a^2+b^2+c^2$ = 9+16+25 = **50**.

Note WHICH corner is "top" – mixed rules (like top×left–right) are position-sensitive, unlike plain sums.

✓ Triangles almost always use ALL three corners – unlike squares, there's rarely a "decoy" number here.

⑦ Boxes / Tables — One Rule Per Row

A table with **4 columns** per row (a, b, c, d) often needs a **two-step** rule to reach the 4th number.

Table — rule: $a + b - c = d$

8	5	3	**10**
6	4	2	**8**
9	3	5	?

Worked example

Step 1 — Row1: 8+5−3=10. Row2: 6+4−2=8. Confirmed.

Step 2 — Row3: 9+3−5.

Answer → ? = **7**. ✅

Second table — rule: $a \times b \div c = d$

8,3,4,6 (8×3÷4=6) · 10,6,5,12 (10×6÷5=12) · 9,4,3,? → 9×4÷3 = **12**.

Trap — Row1 alone (8,5,3,10) can ALSO look like "8+5−3" by fluke. Never finalise from Row1; Row2 is the real proof.

✓ 4-column tables are just a "written-out" version of the same grids — the Golden Method from page 1 still applies directly.

⑧ Two-Figures Analogy for Numbers

Two COMPLETE figures are given first (to let you find/confirm the rule); a third, incomplete figure follows the same rule.

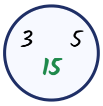


Figure 1

Figure 2

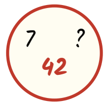


Figure 3

Worked example

Step 1 — Fig1: $3\times5=15$. Fig2: $4\times6=24$. Rule confirmed — centre = product.

Step 2 — Fig3: $7\times? = 42$.

Answer → ? = **6**. ✅

Second pair — triangles, sum rule

Fig1 corners 2,3,4→centre 9. Fig2 corners 5,1,6→centre 12 (confirms sum). Fig3 corners 7,2,? →centre 13 ⇒ ? = **4**.

This is exactly Step 3 ("confirm") of the Golden Method, made explicit by the question itself — two full examples handed to you for free!

If Fig1 and Fig2 give DIFFERENT-looking rules, look for a rule that fits both simultaneously — usually a mixed 2-step one.

⑨ Squares, Cubes & ± Constant

Watch for hidden n^2 or n^3 patterns — SSC loves disguising a square/cube table as a "difference" grid.

3	2	5
4	3	7
5	4	?

Worked example — rule: $a^2-b^2=c$

Step 1 — Row1: $3^2-2^2=9-4=5$. Row2: $4^2-3^2=16-9=7$ ✓.

Step 2 — Row3: $5^2-4^2=25-16$.

Answer → ? = **9**. Looks like "add 2" at a glance — it's really squares! ✅

Cube-pair series

2	3	4
8	27	?

Each pair is (n, n^3): 2→8, 3→27, so 4→**64**.

Try these — ring adds a constant (+5) clockwise

- 8, 13, 18, ?, 28 → each +5 ∴ ? = **23**.

If differences 5, 7, 9... keep growing by 2, suspect squares (n^2); if they double, suspect powers of 2 or cubes.

⑩ Common Traps & The Systematic Method ⚠

Six traps that trip up most students

- Assuming addition first and stopping there — always test × and mixed rules too.
- Testing row rule when the real rule runs down COLUMNS or along a DIAGONAL.
- Flipping subtraction/division order between figures (a−b in one, b−a in another).
- Locking a rule from ONE figure without confirming on a second.
- In circles, confusing "sum of all 4" with "sum of opposite pair only".
- Assuming ? is always bottom-right — it can sit anywhere in the figure.

Worked example — the classic "coincidence" trap

Row1: 4,3,7 · Row2: 5,2,5 · Row3: 6,4,?

Wrong guess — "a+b=c" fits Row1 (4+3=7) perfectly...

...but fails Row2 — 5+2=7 ≠ 5. Reject it!

Real rule — a×b−5=c: Row1 4×3−5=7 ✓, Row2 5×2−5=5 ✓.

Answer → Row3: 6×4−5 = 19. ✅

This single example is why Step 3 ("Confirm") of the Golden Method exists – a rule that fits Row1 alone can still be completely wrong.

✓ Under exam time-pressure: try add → multiply → add-then-multiply → multiply-then-subtract, in that order – covers 90% of SSC papers.

Exercise

Find the missing number in each figure. Answers & working on the next page.

Q1

2	4	8
3	2	6
5	3	?

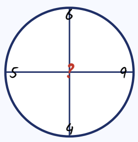
(1) 15 (2) 12 (3) 20 (4) 18

Q2

3	6	9
4	5	2
7	11	?

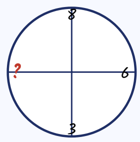
(1) 9 (2) 11 (3) 13 (4) 15

Q3



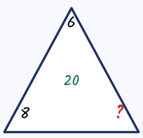
(1) 22 (2) 23 (3) 24 (4) 26

Q4



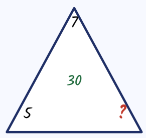
rule: N×S = E×W (1) 3 (2) 4 (3) 5 (4) 6

Q5



centre = sum (1) 4 (2) 5 (3) 6 (4) 7

Q6



centre = top×left−right (1) 3 (2) 4 (3) 5 (4) 6

Q7

Table rule a+b−c=d:

6, 5, ?, 7 (row rule confirmed elsewhere)

(1) 3 (2) 4 (3) 5 (4) 6

Q8

Analogy (product rule):

3,5→15 · 4,6→24 · 7,?→42

(1) 5 (2) 6 (3) 7 (4) 8

Attempt every question BEFORE peeking at the Answer Key on page 12 — that's how the Golden Method sticks.

Answer Key & Revision ✓

Answer Key — with the operation

Q1 → **15** (5×3) · **Q2** → **11** (9+2, col-rule) · **Q3** → **24** (6+9+4+5) · **Q4** → **4** (8×3=6×4) · **Q5** → **6** (20−6−8) · **Q6** → **5** (7×5−30) · **Q7** → **4** (6+5−7) · **Q8** → **6** (42÷7).

Bonus solved — diagonal rule

Grid: 4,2,8 · 5,6,3 · 7,1,? → anti-diag 8+6+7=21; main-diag 4+6+? =21 ∴ ? = **11**. ✅

Bonus solved — square-plus rule

Rule $a^2+b=c$: 3,7,16(9+7) · 4,9,25(16+9) · 5,11,? → 25+11 = **36**. ✅

Quick Revision

- ✓ Golden Method: Scan → Guess → Confirm on a 2nd row/figure → Apply. Never trust ONE row alone.
- ✓ 3×3 grids: test row → column → diagonal → whole-grid, in that order. Circles: sum first, then product, then 2-step.
- ✓ Triangles use ALL 3 corners; analogy questions hand you two full figures — use them to lock the rule before touching figure 3.
- ✓ Keep operation ORDER identical across all figures (a−b, not sometimes b−a); watch for hidden squares/cubes.

☆ Find the rule, not just the number! ☆