

त्रिभुज

इस अध्याय के सभी महत्वपूर्ण प्रश्न – उत्तर सहित। पहले खुद हल करने की कोशिश करो, फिर उत्तर मिलाओ।

अभ्यास प्रश्न-उत्तर (हर टॉपिक से)

- » भूमिका - त्रिभुज क्या है?
- » सर्वांगसम आकृतियाँ - दैनिक जीवन के उदाहरण
- » त्रिभुजों की सर्वांगसमता और शीर्षों की संगतता
- » CPCT - सर्वांगसम त्रिभुजों के संगत भाग
- » सर्वांगसमता के लिए पर्याप्त समता - प्रारंभिक क्रियाकलाप
- » SAS सर्वांगसमता नियम (अभिवृद्धि)
- » SAS के अनुप्रयोग - उदाहरण 1 और 2
- » ASA प्रमेय और AAS सर्वांगसमता नियम

हल किए हुए उदाहरण (step-by-step)

उदाहरण 1. PQR mein sides, angles aur vertices ke naam likho. Agar figure open ho (sirf do lines milen), kya woh triangle hoga?

- › PQR: sides PQ, QR, RP; angles P, Q, R; vertices P, Q, R
- › Triangle definition: three intersecting lines se bani closed figure
- › Open figure closed nahi triangle nahi

उत्तर – Sides PQ, QR, RP; angles P, Q, R; vertices P, Q, R. Open figure triangle nahi hota.

उदाहरण 2. Figure 7.3 jaisi situation: ek square side 2 cm, doosra side 4 cm, teesra side 2 cm. Kaun-kaun original 2 cm square ke congruent hain?

- › Congruent = same shape + same size
- › 4 cm square bada hai congruent nahi
- › 2 cm square same size congruent hai

उत्तर – Sirf 2 cm side wala square congruent hai; 4 cm wala congruent nahi.

उदाहरण 3. Agar ABC XYZ hai, toh corresponding sides aur angles likho. Kya BCA XYZ sahi hai?

- › Correspondence: AX, BY, CZ
- › Sides: AB=XY, BC=YZ, CA=ZX; angles: A=X, B=Y, C=Z
- › BCA XYZ BX, CY, AZ – yeh di gayi correspondence nahi galat

उत्तर – AB=XY, BC=YZ, CA=ZX; A=X, B=Y, C=Z. BCA XYZ galat hai (order mismatch).

उदाहरण 4. ABC XYZ diya hai. CPCT se BC aur A ke corresponding parts likho.

- › Correspondence: AX, BY, CZ
- › Side BC side YZ
- › Angle A angle X

उत्तर – BC = YZ aur A = X (by CPCT).

उदाहरण 5. ABC aur PQR mein $AB = PQ$ aur $A = P$. Kya triangles zaroor congruent hain? Kyun?

- › NCERT activity: ek side + ek angle ki equality पर्याप्त नहीं
- › Included angle ya doosri needed conditions missing ho sakti hain
- › Conclude: zaroor congruent nahi – aur data chahiye

उत्तर – Nahi, zaroor congruent nahi. Sirf ek side aur ek angle ki equality congruence ke liye पर्याप्त नहीं।

उदाहरण 6. ABC aur PQR mein $AB=PQ=5$ cm, $AC=PR=6$ cm, $A=P=40^\circ$. Kya SAS lagega? ABC PQR?

- › Equal sides AB, AC aur unka included angle A
- › Corresponding: PQ, PR with included P
- › Conditions SAS satisfy triangles congruent

उत्तर – Haan, SAS lagega. ABC PQR (by SAS).

उदाहरण 7. AB ka midpoint M hai, PM $\perp$ AB. Agar $AM = 3$ cm, $PM = 4$ cm, toh PA aur PB mein relation kya hai? Kaunsa rule?

- › $AM=BM=3$ cm, $\angle PMA=\angle PMB=90^\circ$, PM common
- › $\triangle PMA \cong \triangle PMB$ by SAS
- › CPCT $PA = PB$

उत्तर – $PA = PB$ (P is equidistant from A and B) by SAS + CPCT.

उदाहरण 8. ABC aur PQR mein $A=P=40^\circ$, $B=Q=70^\circ$, $AB=PQ$. Kya congruent hain? Kaunsa rule?

- › Do angles equal third angles bhi equal: $C=R=180^\circ-110^\circ=70^\circ$
- › Ab two angles aur corresponding side – AAS
- › Hence triangles congruent

उत्तर – Haan, ABC PQR by AAS (third angles equal from angle sum).

बोर्ड परीक्षा के लिए खास

- Definition likhte waqt 'बंद आकृति' zaroor likho – sirf 'teen bhujayein' incomplete answer maana ja sakta hai.
- Definition mein 'समान आकार और समान माप' dono likho – sirf shape incomplete hai.
- Proof mein pehle correspondence clearly likho (AD etc.) – examiner ko clarity pasand aati hai.
- Har proof step mein reason bracket mein likho: (SAS) ya (CPCT) – stepwise marking milti hai.
- 'Is data se congruent?' type MCQ mein pehle poochho: included angle hai kya? Position matter karta hai.
- Proof mein clearly likho kaunsi do sides aur kaun-sa included angle – 'included' word marks secure karta hai.
- Parallel prove karte waqt CPCT ke baad alternate/corresponding angles clearly name karo – 'hence parallel'.
- Exam mein AAS use karte waqt ek line likho: 'third angles equal (angle sum property)' – warna examiner AAS doubt kar sakta hai.

एक नज़र में रिवीज़न

- › Triangle = closed 3-sided figure; chapter focus = congruence + more properties + inequalities.
- › सर्वांगसम = same shape + same size; cover/overlay se check.
- › Congruence writing = correct vertex correspondence; galat order = galat statement.
- › CPCT only after is proved; corresponding any random part.
- › Insufficient: single side / side+angle; enough for next step: two sides + included angle.
- › SAS mein Angle = included angle; axiom hai, theorem nahi.
- › Vertically opposite + SAS; Midpoint + 90° + common side + SAS equidistant.
- › SAS = axiom; ASA = theorem; AAS follows from 180° angle sum.