CLASS 7 MATHS EXTRA QUESTIONS

Extra Questions for Class 7 Maths Chapter 9: Geometric Twins – HOTS

Fresh practice questions for Class 7 Maths Chapter 9 "Geometric Twins", reinforcing congruence criteria (SSS, SAS, ASA, AAS, RHS).

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Q1.

In ΔPQR and ΔSTU, PQ = ST, QR = TU, and ∠Q = ∠T. Are the triangles congruent? State the criterion.

Answer: ∠Q is the angle included between PQ and QR, and ∠T is included between ST and TU, so this is the **SAS** criterion. ΔPQR ≅ ΔSTU.

Q2.

Two triangles have all three corresponding angles equal but different side lengths. Are they necessarily congruent?

Answer: No. Equal corresponding angles (AAA) only guarantees the triangles are **similar** (same shape), not congruent (same size) — congruence additionally requires at least one pair of corresponding sides to be equal.

Q3.

In right triangles ΔABC and ΔDEF, ∠B = ∠E = 90°, AC = DF (hypotenuses equal), and AB = DE. Name the congruence criterion and state the congruence.

Answer: This is the **RHS (right angle-hypotenuse-side)** criterion. ΔABC ≅ ΔDEF.

Q4. Spot the error

A student claims two triangles are congruent because two sides and a non-included angle are equal (SSA). Is this reasoning valid?

Answer: No. **SSA is not a valid congruence criterion** — two triangles can have two equal sides and a non-included equal angle while still having different shapes (the ambiguous case), so this does not prove congruence.

Q5. HOTS

In an isosceles triangle, the vertex angle is 40°. Find the two base angles.

Answer: Let each base angle = x. Since the base angles of an isosceles triangle are equal: 40° + x + x = 180° ⇒ 2x = 140° ⇒ x = **70°**. Each base angle is 70°.

Q6.

Two triangles ABC and DEF have AB = DE, AC = DF, and ∠B = ∠E, where ∠B is not the angle between AB and AC. If both triangles happen to be right-angled at B and E, does congruence follow?

Answer: Yes — while SSA is generally not valid, the special case where the non-included equal angle is a **right angle** makes AC and DF the hypotenuses, turning this into the **RHS** criterion, which is valid. So ΔABC ≅ ΔDEF in this special right-angled case.

Q7.

An equilateral triangle has all sides equal. What can you say about all of its angles, and why?

Answer: All three angles are equal to **60°** each. Since all sides are equal, the triangle is isosceles in three different ways simultaneously, so all pairs of base angles are equal, forcing all three angles equal; since they sum to 180°, each must be 180° ÷ 3 = 60°.

Q8.

Explain, using an example, why the order of vertices in a congruence statement like ΔABC ≅ ΔDEF matters.

Answer: The order shows exactly which vertices, sides, and angles correspond: A↔D, B↔E, C↔F, so AB↔DE, BC↔EF, CA↔FD, and ∠A↔∠D, etc. Writing it as ΔABC ≅ ΔEFD instead would incorrectly claim AB corresponds to EF and ∠A corresponds to ∠E, which may not be true even if the triangles are congruent under a different correspondence.

Q9.

Two circles have the same radius. Are they necessarily congruent? Explain.

Answer: Yes. Two circles are congruent exactly when they have the same radius, since one can always be superimposed exactly on the other by matching centres when the radii are equal.

Q10.

In ΔXYZ, XY = XZ (isosceles) and the angle bisector from X meets YZ at M. Using congruent triangles, explain why M is the midpoint of YZ.

Answer: In ΔXYM and ΔXZM: XY = XZ (given), ∠YXM = ∠ZXM (XM bisects ∠X), XM = XM (common side). By **SAS**, ΔXYM ≅ ΔXZM. By CPCT, YM = ZM, so M is the midpoint of YZ.

See also: NCERT Solutions for Class 7 Maths Chapter 9

Revision Notes: Revision Notes for Class 7 Maths Chapter 9