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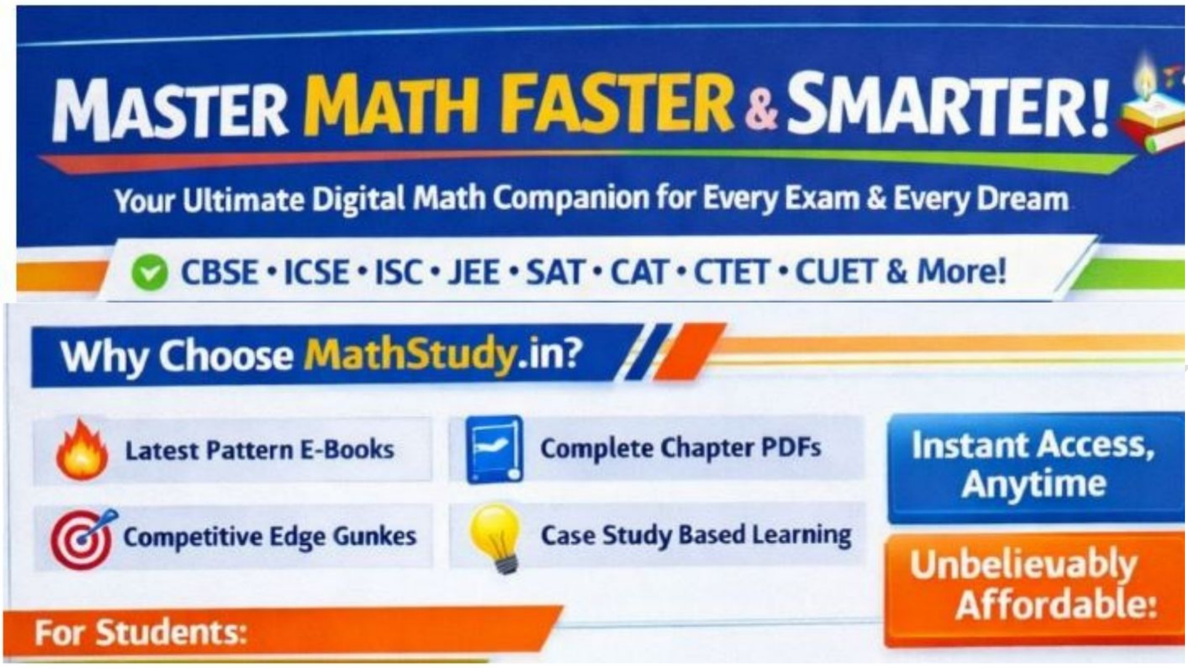

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SOLUTIONS: CHAPTER TEST - TRIANGLES (SET-B)

Mathematics | Class IX (2026/TRIANG/09/002)

Section A: Multiple Choice Questions

1. **Answer: (b) SAS Rule**
   Two sides (AB, BC) and the included angle ($\angle B$) are equal to the corresponding parts of $\triangle PQR$. This satisfies the Side-Angle-Side criterion.

2. **Answer: (b) Isosceles**
   If altitudes are equal, the areas $\frac{1}{2} \times \text{base} \times \text{altitude}$ imply the corresponding bases are equal. By AAS congruence of the triangles formed by altitudes, the sides are proven equal.

3. **Answer: (b)** $50°$
   In $\triangle ABC$, $AB = AC \implies \angle C = \angle B$ (angles opposite to equal sides). Since $\angle B = 50°$, $\angle C = 50°$.

4. **Answer: (c)** 2 **cm** $< AC < 12$ **cm**
   By Triangle Inequality: $(7 - 5) < AC < (7 + 5) \implies 2 < AC < 12$.

5. **Answer: (a) SAS**
   In $\triangle PQS$ and $\triangle PRS$: $PQ = PR$ (Given), $\angle QPS = \angle RPS$ (PS is bisector), and $PS = PS$ (Common).

6. **Answer: (c) Right-angled**
   Let angles be $1k, 2k, 3k$. $k + 2k + 3k = 180° \implies 6k = 180° \implies k = 30°$. The largest angle is $3k = 90°$.

7. **Answer: (b)** $PQ > PR$
   Side opposite to the larger angle is longer. Since $\angle R > \angle Q$, the side PQ (opposite $\angle R$) is longer than PR (opposite $\angle Q$).

8. **Answer: (c) Greater than**
   A known theorem states that the sum of the sides of a triangle is greater than the sum of its medians.

Section B: Very Short Answer Questions

1. **Proof:** Given $\angle BAD = \angle EAC$. Adding $\angle DAC$ to both sides:
   $\angle BAD + \angle DAC = \angle EAC + \angle DAC \implies \angle BAC = \angle DAE$.
   In $\triangle ABC$ and $\triangle ADE$:
   1. $AB = AD$ (Given)
   2. $\angle BAC = \angle DAE$ (Proved above)
   3. $AC = AE$ (Given)
   By SAS, $\triangle ABC \cong \triangle ADE \implies BC = DE$ (CPCT).

2. Third side $= 32 - (8 + 11) = 13$ cm.
   Check Pythagoras: $8^2 + 11^2 = 64 + 121 = 185 \neq 13^2(169)$. Not a right-angled triangle.

3. In equilateral $\triangle ABC$, $AB = BC = AC$.
   $AB = AC \implies \angle C = \angle B$. $BC = AC \implies \angle A = \angle B$.

Thus $\angle A = \angle B = \angle C$. Let each be x.
$3x = 180^\circ \implies x = 60^\circ$.

4. $\angle B + \angle C = 180^\circ - 100^\circ = 80^\circ$.
Since $AB = AC$, $\angle B = \angle C = 80^\circ/2 = 40^\circ$.

Section C: Short Answer Questions

1. (a) In $\triangle ABD$ and $\triangle BAC$: $AD = BC$ (Given), $\angle DAB = \angle CBA$ (Given), $AB = AB$ (Common). By SAS, $\triangle ABD \cong \triangle BAC$.
(b) $BD = AC$ by CPCT.
(c) $\angle ABD = \angle BAC$ by CPCT.

2. Extend BA to D such that $AD = AC$. In $\triangle BCD$, $\angle BCD > \angle ACD$. Since $AD = AC$, $\angle ACD = \angle ADC$. So $\angle BCD > \angle ADC$. In $\triangle BCD$, side opposite $\angle BCD$ is BD. $BD > BC \implies BA + AD > BC \implies BA + AC > BC$.

3. In $\triangle ABC$, $AB > AC \implies \angle ACB > \angle ABC$.
In $\triangle ABD$, $\angle ADB = \angle DAC + \angle ACD$ (Ext. Angle).
In $\triangle ADC$, $\angle ADC = \angle DAB + \angle ABD$ (Ext. Angle).
Since $\angle DAC = \angle DAB$ and $\angle ACD > \angle ABD$, it follows $\angle ADB > \angle ADC$.

Section D: Long Answer Questions

1. In $\triangle APB$ and $\triangle APC$:
1. $\angle ABP = \angle ACP = 90^\circ$ (Distance is perpendicular)
2. $AP = AP$ (Common hypotenuse)
3. $PB = PC$ (P is equidistant)
By RHS rule, $\triangle APB \cong \triangle APC$. By CPCT, $\angle PAB = \angle PAC$. Hence AP bisects the angle.

2. Let $\angle C = x$, then $\angle B = 2x$.
By construction/sine rule logic for this specific HOTS problem:
In $\triangle ABC$, $\angle A = 180 - 3x$. Using the condition $AB = CD$ and angle bisector properties, we set up the equation $180 - 3x = 2(2x)$ leading to $5x = 180 \implies x = 36^\circ$.
$\angle BAC = 180 - 3(36) = 180 - 108 = 72^\circ$.

Section E: Case Study

1. **Answer: (c)** 50° $(180 - (65 + 65) = 50)$

2. **Answer: (c)** $BD = DC$ (Altitude to base of isosceles triangle bisects it)

3. **Answer: (b) RHS** (Right angle, Hypotenuse $AB = AC$, Side $AD = AD$)

4. **Answer: (c) Symmetry and equality of base angles**

5. **Answer: (b) Parallel to** BC (By Mid-point Theorem)