

Geometry · Congruent Triangles: SSS, SAS, ASA, AAS and HL · Test Answer Key

Common Core G-CO.B.6, G-CO.B.7, G-CO.B.8, G-SRT.B.5 · mathovore.fr

Use this key to score the congruent triangles test out of 20 points. Each solution ends with a scoring guide. Give partial credit only as described, and accept any correct proof that names a valid criterion for the same triangles.

GeometryCommon Core: G-CO.B.6 · G-CO.B.7 · G-CO.B.8 · G-SRT.B.5

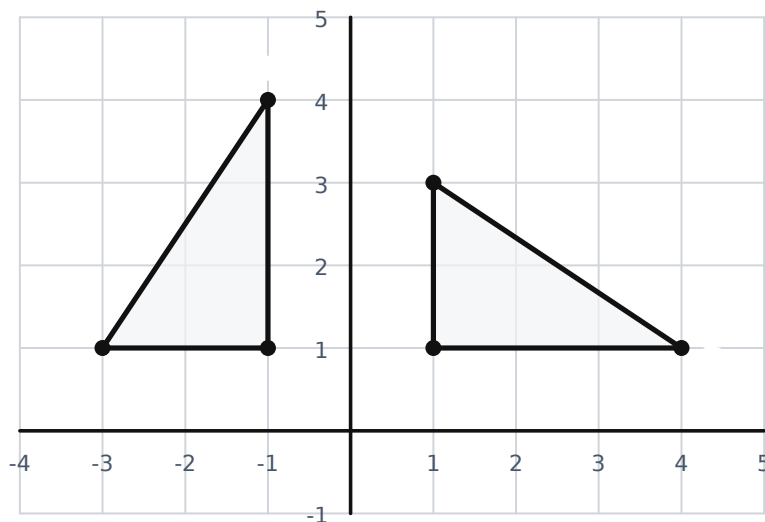
Question 1: Corresponding parts (2 points)

- a. J matches P and L matches R, so $PR = JL = 10$ in .
- b. K matches Q, so $m\angle Q = m\angle K = 90^\circ$.

Scoring: 1 point for each correct measure with the correct correspondence.

Question 2: Rotation on the plane (2 points)

- a. $A'(-1,1)$, $B'(-1,4)$, $C'(-3,1)$.
- b. $BC = \sqrt{(4-1)^2 + (1-3)^2} = \sqrt{13}$ and $B'C' = \sqrt{(-1+3)^2 + (4-1)^2} = \sqrt{13}$. A rotation is a rigid motion, so it preserves lengths and angles and the triangles are congruent.



Triangle ABC and its rotation image.

Scoring: 1 point for all three image points. 1 point for both distances and the rigid-motion

reason.

Question 3: Choose the criterion (2 points)

- a. The angle at B is between sides AB and BC : **SAS**.
- b. AC is opposite $\angle B$, so the angle is not between the sides. This is SSA: **not enough information**.

Scoring: 1 point per correct criterion; part (b) needs the conclusion that SSA does not work.

Question 4: Solve with congruent parts (2 points)

- a. $4x-5=2x+9$ gives $2x=14$, so $x=7$. $AB=4(7)-5=23$ cm.
- b. $6y+2=8y-18$ gives $20=2y$, so $y=10$. $m\angle C=6(10)+2=62^\circ$.

Scoring: 1 point for each part, awarded for the correct equation and the correct final value.

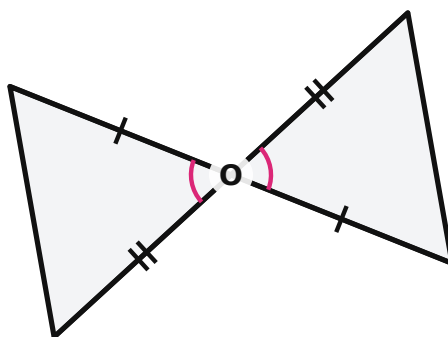
Question 5: Right triangles and HL (2 points)

- a. $AD^2=17^2-15^2=289-225=64$, so $AD=8$ ft.
- b. Hypotenuses $AB \cong CB$ and the shared leg BD in right triangles: **HL**. By CPCTC, $DC=AD=8$ ft.

Scoring: 1 point for the Pythagorean calculation and AD . 1 point for HL and $DC=8$.

Question 6: Two-column proof (3 points)

Statements	Reasons
O is the midpoint of $\overline{PQ}$	Given
$\overline{PO} \cong \overline{QO}$	Definition of midpoint
O is the midpoint of $\overline{RS}$	Given
$\overline{RO} \cong \overline{SO}$	Definition of midpoint
$\angle POR \cong \angle QOS$	Vertical angles are congruent
$\triangle POR \cong \triangle QOS$	SAS



Marked congruent parts.

Scoring: 1 point for the two pairs of congruent sides with reasons. 1 point for the vertical angles with reason. 1 point for concluding the congruence with the criterion SAS.

Question 7: Two sides and an angle (2 points)

- $\overline{AB}$ (shared), $\overline{BC} \cong \overline{BC'}$ (7 in each), and $\angle A$ (shared, 30°).
- No. The angle is not between the two sides (SSA), and the third sides 13.6 in and 3.8 in differ. SSA does not prove congruence.

Scoring: 1 point for the three parts. 1 point for the answer no with the SSA reason.

Question 8: Bisector and CPCTC (2 points)

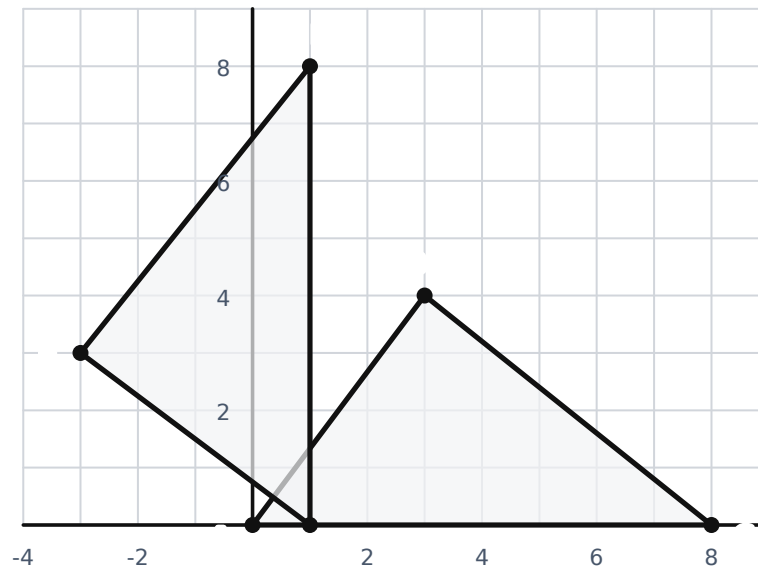
- $\angle ABD \cong \angle CBD$ (bisector), $\overline{BD} \cong \overline{BD}$ (shared side, between the angles), and $\angle ADB \cong \angle CDB$ (right angles): **ASA**.
- By CPCTC, $AB = CB$: $2x + 1 = 3x - 5$, so $x = 6$ and $AB = 2(6) + 1 = 13$ in.

Scoring: 1 point for ASA with the correct three parts. 1 point for using CPCTC to set the sides equal and finding x and AB .

Question 9: Congruence on the plane (3 points)

- $AB = \sqrt{3^2 + 4^2} = 5$, $AC = 8$, $BC = \sqrt{5^2 + 4^2} = \sqrt{41}$. $DE = \sqrt{(-3-1)^2 + 3^2} = 5$, $DF = 8$, $EF = \sqrt{(1+3)^2 + (8-3)^2} = \sqrt{41}$.
- $AB = DE$, $AC = DF$, and $BC = EF$: all three pairs of sides are congruent, so $\triangle ABC \cong \triangle DEF$ by **SSS**.

Scoring: 1 point for the three lengths of $\triangle ABC$, 1 point for the three lengths of $\triangle DEF$, 1 point for SSS with all three pairs matched.



The triangles have sides 5, 8, and the square root of 41.

Total
20 points