

Proving Triangles Congruent: SSS to HL

Grade 10 – Geometry math · Test · Standards: G-CO.B.6, G-CO.B.7, G-CO.B.8, G-SRT.B.5

Name: _____ Date: _____ Class: _____

Eight questions, 20 points, 45 minutes. Write a reason for every statement in a proof. Figures are not drawn to scale; use the marks, not the appearance.

Standards: G-CO.B.6, G-CO.B.7, G-CO.B.8, G-SRT.B.5 · **Level:** Grade 10 Geometry

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Corresponding parts with algebra (2 points)

$\triangle ABC \cong \triangle DEF$.

- a. $AB = 4x - 3$ and $DE = 2x + 9$. Find DE . (1 point)
- b. $m\angle C = (7y - 6)^\circ$ and $m\angle F = (4y + 18)^\circ$. Find $m\angle F$. (1 point)

Question 2 Choose the criterion (3 points)

For each set of givens about $\triangle ABC$ and $\triangle DEF$, name the criterion that proves congruence, or write "none."

- a. $AB \cong DE$, $\angle B \cong \angle E$, $BC \cong EF$ (1 point)
- b. $\angle A \cong \angle D$, $AC \cong DF$, $\angle C \cong \angle F$ (1 point)
- c. $AB \cong DE$, $BC \cong EF$, $\angle A \cong \angle D$ (1 point)

Question 3 Right triangles (3 points)

Right triangles ABC and DEF have right angles at B and E , hypotenuses $AC = DF = 15$, and legs $AB = DE = 9$.

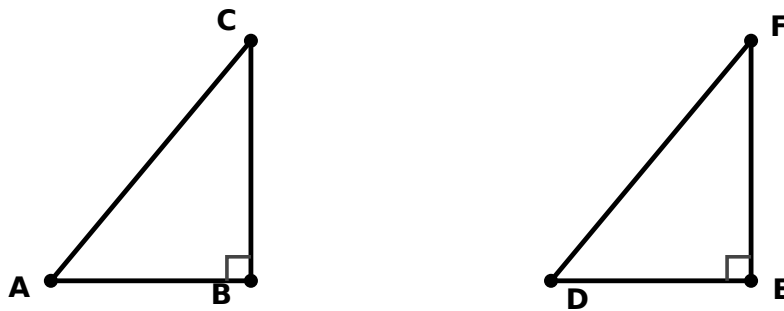


Figure for Question 3.

- Name the criterion that proves the triangles congruent. (1 point)
- Find BC . (1 point)
- Find the area of $\triangle DEF$. (1 point)

Question 4 Prove with SAS (3 points)

Given: $AB \parallel DC$ and $AB \cong DC$. Prove: $\triangle ABC \cong \triangle CDA$.

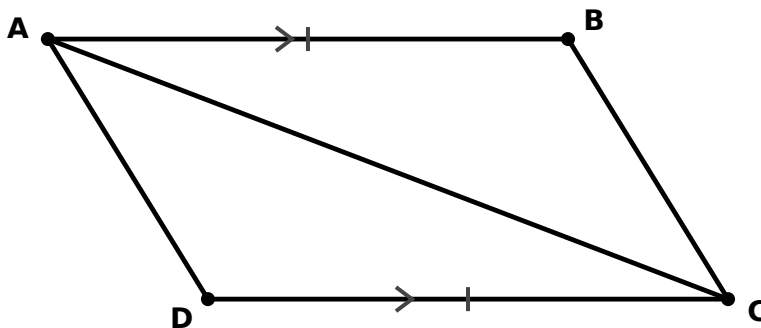


Figure for Question 4.

Question 5 Congruence on the plane (3 points)

$\triangle RST$ has $R(0, 0)$, $S(6, 0)$ and $T(6, 8)$. $\triangle UVW$ has $U(1, 1)$, $V(1, 7)$ and $W(9, 7)$. Show that the triangles are congruent.

Question 6 Why SSA fails (2 points)

Two triangles each have sides of 7 and 10 and a 35° angle that is not between them. Must the triangles be congruent? Explain.

Question 7 Truss beams (2 points)

A roof truss uses congruent triangles $\triangle ABC \cong \triangle DEF$. $AB = 3.5$ m, $BC = 4.2$ m and $CA = 5.6$ m. Find DF . Beams cost \$12.50 per meter. What is the cost of the beams for both triangles?

Question 8 Paragraph proof with ASA (2 points)

Given: BD bisects $\angle ABC$ and $\angle ADC$. Prove: $AB \cong CB$. Write a short paragraph proof.

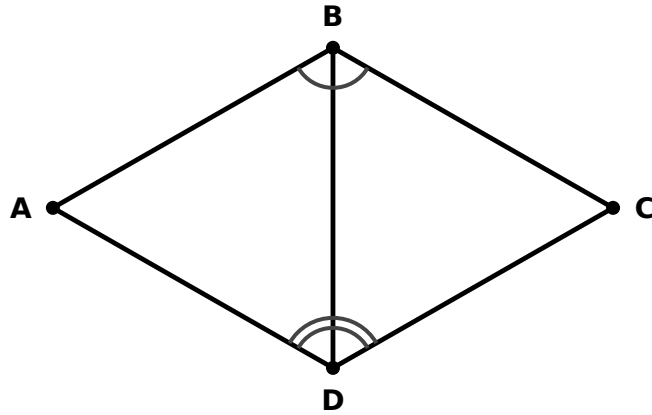


Figure for Question 8.