LESSON MAKER PRO

Triangle Proof Lab

Match equal parts to prove triangles congruent.

HIGH SCHOOL · G.2D.1.9

G.2D.1.9 "Construct logical arguments to prove triangle congruence (SSS, SAS, ASA, AAS and HL)."

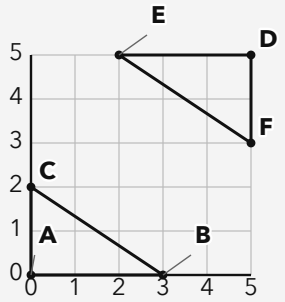
NAME _____ **DATE** _____

BUILD THE ARGUMENT

Match vertices in the same order, then identify equal sides and angles. Use SSS, SAS, ASA, AAS, or HL to justify congruence. HL applies only to right triangles.

WORKED EXAMPLE

Use the grid to prove △ABC ≅ △DEF.



1. Count grid units: AB = DE = 3.
2. Count grid units: AC = DF = 2.
3. ∠A and ∠D are right angles between those sides.

Answer: △ABC ≅ △DEF by SAS.

PRACTICE 4 problems

1 AB = DE = 4, BC = EF = 6, and AC = DF = 8. Prove △ABC ≅ △DEF. Name the rule.

ANSWER _____

2 ∠J = ∠M = 45°, JK = MN = 5, and ∠K = ∠N = 70°. Prove △JKL ≅ △MNO. Name the rule.

ANSWER _____

3 ∠P = ∠S = 35°, ∠Q = ∠T = 65°, and PR = SU = 7. Prove △PQR ≅ △STU. Name the rule.

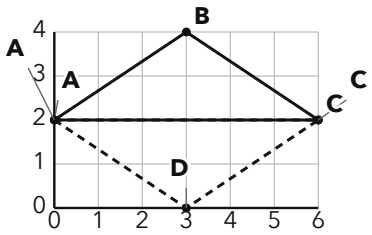
ANSWER _____

4 ∠H and ∠L are right angles. GI = KM = 10 and GH = KL = 6. Prove △GHI ≅ △KLM. Name the rule.

ANSWER _____

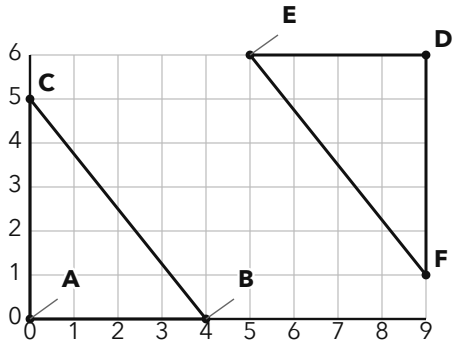
APPLY IT Show your work

1 A skatepark designer models two ramp panels on the grid. Prove △ABC ≅ △ADC. Name the equal sides and the rule.



ANSWER _____

2 A game artist plots two right-triangle badge tiles. Prove △ABC ≅ △DEF using a hypotenuse and a leg.



ANSWER _____

CHALLENGE One step up

AB = DE = x + 4, BC = EF = 2x - 1, and AC = DF = 11. If AB = BC, find x and prove △ABC ≅ △DEF.

WORK SPACE AND ANSWER

ANSWER KEY # Triangle Proof Lab

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	AB = DE = 4, BC = EF = 6, and AC = DF = 8. Prove △ABC ≅ △DEF. Name the rule.	**All three corresponding side pairs are equal, so △ABC ≅ △DEF by SSS.**
2	∠J = ∠M = 45°, JK = MN = 5, and ∠K = ∠N = 70°. Prove △JKL ≅ △MNO. Name the rule.	**The equal side lies between the two equal angles, so △JKL ≅ △MNO by ASA.**
3	∠P = ∠S = 35°, ∠Q = ∠T = 65°, and PR = SU = 7. Prove △PQR ≅ △STU. Name the rule.	**The equal side is not between the two equal angles, so △PQR ≅ △STU by AAS.**
4	∠H and ∠L are right angles. GI = KM = 10 and GH = KL = 6. Prove △GHI ≅ △KLM. Name the rule.	**GI and KM are the hypotenuses, and GH and KL are corresponding legs. Thus △GHI ≅ △KLM by HL.**

PART 2 · APPLY IT

1. **AB = AD, BC = DC, and AC = AC. Therefore △ABC ≅ △ADC by SSS.** B and D are the same horizontal distance from A and C and the same vertical distance from AC. The triangles also share AC.
2. **△ABC ≅ △DEF by HL.** ∠A and ∠D are right angles. AB = DE = 4, and hypotenuses BC and EF are equal because each joins endpoints 4 units apart horizontally and 5 units apart vertically.

CHALLENGE

x + 4 = 2x - 1, so x = 5. The corresponding sides are 9, 9, and 11 in both triangles, so △ABC ≅ △DEF by SSS.

Accept any proof that identifies the required corresponding parts and a valid congruence rule. In the skatepark problem, grid-distance reasoning is sufficient without calculating side lengths.