LESSON MAKER PRO

Triangle Match Moves

Use rigid motions and matching parts to prove congruence.

HIGH SCHOOL · MT.CORE.GEOM.TRANS.2

MT.CORE.GEOM.TRANS.2 "Define the congruence of two and show that two figures are congruent by finding a sequence of rigid motions that maps one figure to the other by: Using the definition of congruence in terms of rigid motions to show that two triangles are..."

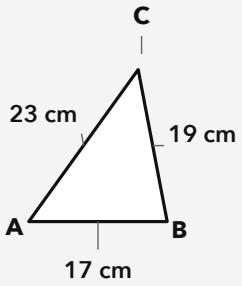
NAME _____ DATE _____

THE BIG IDEA

Rigid motions keep lengths and angle measures the same. Two triangles are congruent exactly when all corresponding sides and angles match. SSS, SAS, or ASA gives enough information to prove they match.

WORKED EXAMPLE

Triangle ABC is shown. Triangle DEF has DE = 17 cm, EF = 19 cm, and FD = 23 cm. Explain why the triangles are congruent.



1. Match AB with DE, BC with EF, and CA with FD.
2. All three side pairs match, so SSS applies.
3. Move A to D and rotate AB onto DE. C lands on F or its reflection across DE.
4. Reflect across DE if needed.

Answer: Triangle ABC ≅ triangle DEF.

PRACTICE 4 problems

1 AB = DE = 5, BC = EF = 8, and CA = FD = 11. Name the test and write the congruence statement.

ANSWER _____

2 AB = DE = 6, AC = DF = 10, and ∠A = ∠D = 40°. Name the test and write the congruence statement.

ANSWER _____

3 ∠B = ∠E = 35°, ∠C = ∠F = 70°, and BC = EF = 8. Name the test and write the congruence statement.

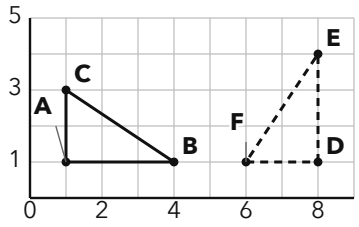
ANSWER _____

4 AB = DE = 9, AC = DF = 7, and ∠B = ∠E = 30°. Is congruence guaranteed? Explain briefly.

ANSWER _____

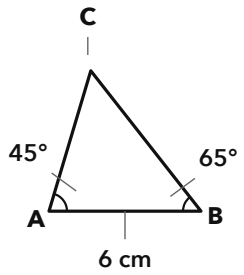
APPLY IT Show your work

1 A game designer places two hitbox triangles on a grid. Give rigid motions that map ABC to DEF. Are they congruent?



ANSWER _____

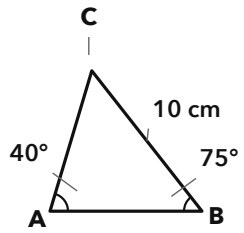
2 A student designs the triangular patch shown for a jacket. A second patch, DEF, has DE = 6 cm, ∠D = 45°, and ∠E = 65°. Are the patches congruent? Name the test.



ANSWER _____

CHALLENGE One step up

A sports logo uses triangle ABC. A second logo, DEF, has ∠D = 40°, ∠E = 75°, and EF = 10 cm. Find ∠C, then prove the triangles congruent using ASA.



WORK SPACE AND ANSWER

ANSWER KEY

Triangle Match Moves

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	AB = DE = 5, BC = EF = 8, and CA = FD = 11. Name the test and write the congruence statement.	**SSS; triangle ABC ≅ triangle DEF.**
2	AB = DE = 6, AC = DF = 10, and ∠A = ∠D = 40°. Name the test and write the congruence statement.	**SAS; triangle ABC ≅ triangle DEF.**
3	∠B = ∠E = 35°, ∠C = ∠F = 70°, and BC = EF = 8. Name the test and write the congruence statement.	**ASA; triangle ABC ≅ triangle DEF.**
4	AB = DE = 9, AC = DF = 7, and ∠B = ∠E = 30°. Is congruence guaranteed? Explain briefly.	**No. These parts form SSA, which can produce two different triangles.**

PART 2 · APPLY IT

1. **Translate ABC 7 units right, then rotate it 90° counterclockwise about D. Yes, the triangles are congruent.** The translation sends A to D. The rotation sends B to E and C to F, so the rigid motions map the entire triangle onto DEF.
2. **Yes. Triangle ABC ≅ triangle DEF by ASA.** AB corresponds to DE, and the equal angles at A and B are at the ends of those sides. The two angle pairs and their included side establish ASA.

CHALLENGE

∠C = 65°. Then ∠F = 65°, so ∠B = ∠E, BC = EF, and ∠C = ∠F. Triangle ABC ≅ triangle DEF by ASA.

Accept any valid rigid-motion sequence for the grid problem. In the challenge, students should find the missing angle before applying ASA.