LESSON MAKER PRO

Triangle Match Moves

Use rigid motions to test triangle congruence.

HIGH SCHOOL · GDA.GM.E.25

GDA.GM.E.25 "Verify criteria for showing triangles are congruent using a sequence of rigid motions that map one triangle to another. a. Verify that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of..."

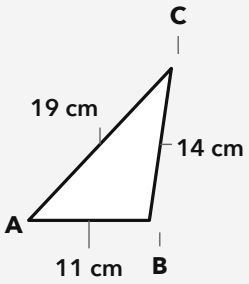
NAME _____ DATE _____

MATCH THE PARTS

Triangles are congruent exactly when every pair of corresponding sides and angles matches. SSS, SAS, ASA, or AAS gives enough information to prove congruence: translate and rotate to align matching parts, then reflect if needed.

WORKED EXAMPLE

Triangle DEF has DE = 11 cm, EF = 14 cm, and DF = 19 cm. Use the figure to show that ABC and DEF are congruent.



1. Match AB with DE, BC with EF, and AC with DF.
2. Translate and rotate ABC to place AB on DE.
3. Reflect across DE if C is on the opposite side from F.

Answer: ABC and DEF are congruent by SSS.

PRACTICE 4 problems

1 In triangles ABC and DEF, AB = DE = 6, AC = DF = 8, and ∠A = ∠D = 40°. Name the test and a rigid-motion plan.

ANSWER _____

2 In triangles ABC and DEF, ∠A = ∠D = 45°, AB = DE = 9, and ∠B = ∠E = 65°. Name the test and find ∠C.

ANSWER _____

3 In triangles PQR and XYZ, ∠P = ∠X = 35°, ∠Q = ∠Y = 75°, and PR = XZ = 7. Name the test and find ∠R.

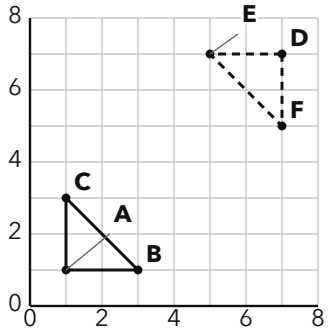
ANSWER _____

4 In triangles JKL and MNO, JK = MN = 4, KL = NO = 6, and JL = MO = 9. Name the test. Why might a reflection be needed?

ANSWER _____

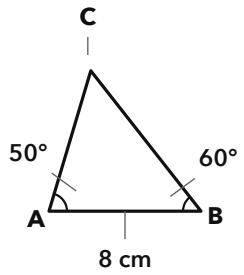
APPLY IT Show your work

1 A game designer duplicates a triangular icon. Which single rigid motion maps ABC onto DEF? Give its center.



ANSWER _____

2 A maker cuts the triangular panel shown. A second panel DEF has DE = AB, ∠D = ∠A, and ∠E = ∠B. Find ∠C and name the test that proves the panels congruent.



ANSWER _____

CHALLENGE One step up

A student knows AB = DE, BC = EF, and AC = DF. After AB is placed on DE, C might be on either side of DE. Explain why ABC still maps onto DEF and what this shows about their angles.

WORK SPACE AND ANSWER

ANSWER KEY

Triangle Match Moves

HIGH SCHOOL · GDA.GM.E.25

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	In triangles ABC and DEF, AB = DE = 6, AC = DF = 8, and ∠A = ∠D = 40°. Name the test and a rigid-motion plan.	**SAS. Translate and rotate to align AB with DE, then reflect if needed to place C on F.**
2	In triangles ABC and DEF, ∠A = ∠D = 45°, AB = DE = 9, and ∠B = ∠E = 65°. Name the test and find ∠C.	**ASA; ∠C = 70°.**
3	In triangles PQR and XYZ, ∠P = ∠X = 35°, ∠Q = ∠Y = 75°, and PR = XZ = 7. Name the test and find ∠R.	**AAS; ∠R = 70°.**
4	In triangles JKL and MNO, JK = MN = 4, KL = NO = 6, and JL = MO = 9. Name the test. Why might a reflection be needed?	**SSS. A reflection may be needed to put the third vertices on the same side of the matched base.**

PART 2 · APPLY IT

1. **A 180° rotation about (4, 4).** Each matched pair of vertices has midpoint (4, 4), so a half-turn about that point maps the entire triangle.
2. **∠C = 70°; ASA.** The angles in ABC sum to 180°, so ∠C = 70°. The matching side lies between the two matching angles.

CHALLENGE

SSS fixes the third vertex on one side of the matched base or its reflection on the other side. Reflect if needed to map C onto F. Rigid motions preserve angles, so all corresponding angles are congruent.

Accept any valid sequence of rigid motions with the stated correspondence. A reflection is needed only when the triangles have opposite orientations after alignment.