LESSON MAKER PRO

Triangle Match Moves

Use matching parts and rigid motions to prove congruence.

HIGH SCHOOL · HSG-CO.B.7

CCSS.Math.Content.HSG-CO.B.7 "Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent."

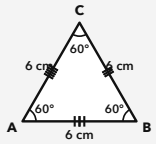
NAME _____ DATE _____

CONGRUENCE BY MOTION

Rigid motions preserve side lengths and angle measures. Two triangles are congruent exactly when a rigid motion can map one onto the other, so every pair of corresponding sides and angles matches.

WORKED EXAMPLE

The figure shows ΔABC. ΔDEF has $DE = EF = FD = 6$ cm and $\angle D = \angle E = \angle F = 60°$. Use $A \leftrightarrow D$, $B \leftrightarrow E$, and $C \leftrightarrow F$. Is ΔABC congruent to ΔDEF?



1. $AB = DE$, $BC = EF$, and $AC = DF$.
2. $\angle A = \angle D$, $\angle B = \angle E$, and $\angle C = \angle F$.
3. All corresponding parts match, so a rigid motion maps one triangle onto the other.

Answer: Yes, $\Delta ABC \cong \Delta DEF$.

PRACTICE 4 problems

1 If $\Delta ABC \cong \Delta RST$, name the side that corresponds to BC and the angle that corresponds to $\angle A$.

ANSWER _____

2 $AB = JK$, $BC = KL$, $AC = JL$, $\angle A = \angle J$, $\angle B = \angle K$, and $\angle C = \angle L$. Write a congruence statement.

ANSWER _____

3 $\Delta PQR \cong \Delta XYZ$, with $Q \leftrightarrow Y$ and $R \leftrightarrow Z$. If $QR = 4x - 1$ and $YZ = 19$, find x.

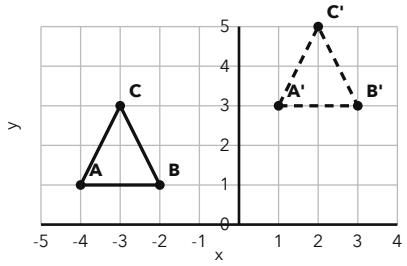
ANSWER _____

4 A rigid motion maps $A \to M$, $B \to N$, and $C \to P$. List the three corresponding side pairs and the three corresponding angle pairs.

ANSWER _____

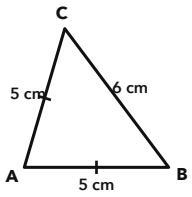
APPLY IT Show your work

1 The theater club moves a triangular light pattern. On the grid, solid ΔABC is the original and dashed ΔA'B'C' is the copy. State the translation and why the triangles are congruent.



ANSWER _____

2 A robotics team uses the triangular brace shown. A replacement has DE = 5 cm, EF = 6 cm, and FD = 5 cm. Write the congruence statement that matches the braces.



ANSWER _____

CHALLENGE One step up

For two triangles, AB = DE, BC = EF, AC = DF, ∠A = ∠D, ∠B = ∠E, and ∠C = ∠F. A student writes ΔABC ≅ ΔDFE. Does that statement use the stated correspondence correctly? Explain.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	If ΔABC ≅ ΔRST, name the side that corresponds to BC and the angle that corresponds to ∠A.	**ST; ∠R**
2	AB = JK, BC = KL, AC = JL, ∠A = ∠J, ∠B = ∠K, and ∠C = ∠L. Write a congruence statement.	**ΔABC ≅ ΔJKL**
3	ΔPQR ≅ ΔXYZ, with Q↔Y and R↔Z. If QR = 4x - 1 and YZ = 19, find x.	**x = 5**
4	A rigid motion maps A→M, B→N, and C→P. List the three corresponding side pairs and the three corresponding angle pairs.	**AB = MN, BC = NP, AC = MP; ∠A = ∠M, ∠B = ∠N, ∠C = ∠P**

PART 2 · APPLY IT

1. **Translate 5 units right and 2 units up. ΔABC ≅ ΔA'B'C' because a translation preserves corresponding side lengths and angle measures.** Compare each vertex coordinate to its primed image. Each x-coordinate increases by 5 and each y-coordinate increases by 2.
2. **ΔABC ≅ ΔDEF.** AB matches DE, BC matches EF, and CA matches FD. The matching side pairs give the vertex correspondence A↔D, B↔E, C↔F.

CHALLENGE

No. The stated pairs map A→D, B→E, and C→F, so the correct statement is ΔABC ≅ ΔDEF. Writing ΔABC ≅ ΔDFE would pair B with F and C with E.

Accept equivalent side and angle notation. For rigid-motion explanations, accept any statement that the motion preserves corresponding lengths and angle measures.