

Move Match Pro

Use rigid transformations to prove congruence.

HIGH SCHOOL • MA.912.GR.2.6

MA.912.GR.2.6 "Apply rigid transformations to map one figure onto another to justify that the two figures are congruent."

NAME _____

DATE _____

CONGRUENCE THROUGH MOTION

Rigid transformations preserve lengths and angle measures, so a figure and its image are congruent. Use the same rule on every vertex, then name the transformation.

WORKED EXAMPLE

Triangle $U(-12,14)$, $V(-10,14)$, and $W(-12,17)$ is translated by $\langle 20, -9 \rangle$. Find the image.

1. Add 20 to each x-coordinate.
2. Add -9 to each y-coordinate.
3. $U'(8,5)$, $V'(10,5)$, $W'(8,8)$.

Answer: Translation $\langle 20, -9 \rangle$; triangle $U'V'W'$ is congruent to triangle UVW .

PRACTICE 5 problems

- 1** Triangle $J(0,1)$, $K(4,1)$, $L(0,6)$ maps to $J'(0,-1)$, $K'(-4,-1)$, $L'(0,-6)$. Name the transformation.

ANSWER _____

- 2** Rectangle $M(1,0)$, $N(1,3)$, $O(7,3)$, $P(7,0)$ is reflected across the y-axis. List its image vertices.

ANSWER _____

- 3** Triangle $T(-7,2)$, $U(-7,4)$, $V(-3,2)$ maps to $T'(-1,13)$, $U'(-1,15)$, $V'(3,13)$. What translation maps it?

ANSWER _____

- 4** Triangle $A(1,6)$, $B(4,6)$, $C(4,11)$ is rotated 90° counterclockwise about the origin. List its image vertices.

ANSWER _____

- 5** Triangle $R(-4,1)$, $S(-1,1)$, $T(-4,4)$ maps to $R'(4,1)$, $S'(1,1)$, $T'(4,4)$. Name the transformation and state whether the triangles are congruent.

ANSWER _____

APPLY IT Show your work

- 1** An esports designer places a triangular icon at $(0,2)$, $(3,2)$, and $(0,7)$. The icon is rotated 90° clockwise about the origin. What are the new coordinates?

WORK SPACE

ANSWER _____

- 2** A student club moves a poster triangle with vertices $(-7,4)$, $(-4,4)$, and $(-7,7)$ by $\langle 11,11 \rangle$. Give the image vertices and explain why the posters are congruent.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Triangle $A(1,2)$, $B(4,2)$, $C(1,6)$ maps to $A'(11,3)$, $B'(11,6)$, $C'(7,3)$. Give one sequence of rigid transformations that maps the triangle.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Triangle J(0,1), K(4,1), L(0,6) maps to J'(0,-1), K'(-4,-1), L'(0,-6). Name the transformation.	A 180° rotation about the origin.
2	Rectangle M(1,0), N(1,3), O(7,3), P(7,0) is reflected across the y-axis. List its image vertices.	M'(-1,0), N'(-1,3), O'(-7,3), P'(-7,0)
3	Triangle T(-7,2), U(-7,4), V(-3,2) maps to T'(-1,13), U'(-1,15), V'(3,13). What translation maps it?	Translation <6,11>
4	Triangle A(1,6), B(4,6), C(4,11) is rotated 90° counterclockwise about the origin. List its image vertices.	A'(-6,1), B'(-6,4), C'(-11,4)
5	Triangle R(-4,1), S(-1,1), T(-4,4) maps to R'(4,1), S'(1,1), T'(4,4). Name the transformation and state whether the triangles are congruent.	Reflection across the y-axis; the triangles are congruent.

PART 2 • APPLY IT

- (2,0), (2,-3), (7,0)** For a 90° clockwise rotation, use (x,y) to (y,-x). Rotation is rigid, so the new icon is congruent to the original.
- (4,15), (7,15), (4,18); the posters are congruent because a translation is rigid.** Add 11 to each x-coordinate and each y-coordinate. A translation preserves all side lengths and angle measures.

CHALLENGE

Rotate 90° counterclockwise about the origin, then translate <13,2>.

Accept correctly ordered coordinate lists. For the challenge, accept any correctly verified rigid-transformation sequence that maps all three vertices.