

Move Match Mission

Use transformation sequences to match figures.

HIGH SCHOOL • MA.912.GR.2.3

MA.912.GR.2.3 "Identify a sequence of transformations that will map a given figure onto itself or onto another congruent or similar figure."

NAME _____

DATE _____

PLAN THE MOVES

A sequence of transformations tells the moves in order. Reflections, rotations, and translations keep a figure congruent, while a dilation can create a similar figure by changing its size.

WORKED EXAMPLE

Triangle ABC has vertices A(11,13), B(15,13), and C(11,17). Map it to A'(19,20), B'(15,20), and C'(19,24).

1. Reflect across the y-axis: A(-11,13), B(-15,13), C(-11,17).
2. Translate 30 units right and 7 units up: A'(19,20), B'(15,20), C'(19,24).

Answer: Reflect across the y-axis, then translate 30 units right and 7 units up.

PRACTICE 6 problems

- 1** Triangle PQR has vertices P(4,6), Q(8,6), and R(4,10). It maps to P'(8,8), Q'(8,4), and R'(12,8). Give one sequence of transformations.

ANSWER _____

- 2** Rectangle EFGH has vertices E(0,5), F(0,9), G(3,9), and H(3,5). It maps to E'(0,-5), F'(0,-9), G'(3,-9), and H'(3,-5). What transformation maps the rectangle?

ANSWER _____

- 3** Triangle JKL has vertices J(-4,8), K(-1,8), and L(-1,10). It maps to J'(4,8), K'(1,8), and L'(1,10). What transformation maps the triangle?

ANSWER _____

- 4** Triangle MNO has vertices M(1,3), N(3,3), and O(1,5). It maps to M'(6,14), N'(10,14), and O'(6,18). Give one sequence of transformations.

ANSWER _____

- 5** Rectangle S has vertices (-6,-2), (6,-2), (6,2), and (-6,2). Give a transformation that maps rectangle S onto itself.

ANSWER _____

- 6** Triangle UVW has vertices U(-8,1), V(-5,1), and W(-8,4). It maps to U'(8,-1), V'(5,-1), and W'(8,-4). Give a two-step sequence of transformations.

ANSWER _____

APPLY IT Show your work

- 1** An esports club is enlarging a triangular logo on a coordinate-grid poster. The original logo has vertices $(2,1)$, $(4,1)$, and $(2,3)$. The enlarged logo has vertices $(8,8)$, $(14,8)$, and $(8,14)$. What sequence of transformations maps the original logo to the enlarged logo?

WORK SPACE

ANSWER _____

- 2** A student designs a dance-team graphic in an image editor. A rectangular sticker has corners $D(-9,2)$, $E(-6,2)$, $F(-6,6)$, and $G(-9,6)$. Its new position has corners $D'(8,-2)$, $E'(5,-2)$, $F'(5,2)$, and $G'(8,2)$. What sequence of transformations maps the sticker to its new position?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Triangle ABC has vertices $A(1,2)$, $B(3,2)$, and $C(1,4)$. It maps to $A'(5,5)$, $B'(5,9)$, and $C'(1,5)$. Name a three-step sequence of transformations. Show the coordinates after each of the first two steps.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Triangle PQR has vertices $P(4,6)$, $Q(8,6)$, and $R(4,10)$. It maps to $P'(8,8)$, $Q'(8,4)$, and $R'(12,8)$. Give one sequence of transformations.	Rotate 90 degrees clockwise about the origin, then translate 2 units right and 12 units up.
2	Rectangle EFGH has vertices $E(0,5)$, $F(0,9)$, $G(3,9)$, and $H(3,5)$. It maps to $E'(0,-5)$, $F'(0,-9)$, $G'(3,-9)$, and $H'(3,-5)$. What transformation maps the rectangle?	Reflect across the x-axis.
3	Triangle JKL has vertices $J(-4,8)$, $K(-1,8)$, and $L(-1,10)$. It maps to $J'(4,8)$, $K'(1,8)$, and $L'(1,10)$. What transformation maps the triangle?	Reflect across the y-axis.
4	Triangle MNO has vertices $M(1,3)$, $N(3,3)$, and $O(1,5)$. It maps to $M'(6,14)$, $N'(10,14)$, and $O'(6,18)$. Give one sequence of transformations.	Dilate by a scale factor of 2 centered at the origin, then translate 4 units right and 8 units up.
5	Rectangle S has vertices $(-6,-2)$, $(6,-2)$, $(6,2)$, and $(-6,2)$. Give a transformation that maps rectangle S onto itself.	Rotate 180 degrees about the origin.
6	Triangle UVW has vertices $U(-8,1)$, $V(-5,1)$, and $W(-8,4)$. It maps to $U'(8,-1)$, $V'(5,-1)$, and $W'(8,-4)$. Give a two-step sequence of transformations.	Reflect across the y-axis, then reflect across the x-axis.

PART 2 • APPLY IT

- Dilate by a scale factor of 3 centered at the origin, then translate 2 units right and 5 units up.** A dilation by 3 sends the vertices to $(6,3)$, $(12,3)$, and $(6,9)$. Translating each point 2 units right and 5 units up gives the enlarged logo.
- Reflect across the y-axis, then translate 1 unit left and 4 units down.** Reflecting across the y-axis gives $(9,2)$, $(6,2)$, $(6,6)$, and $(9,6)$. Moving each point 1 unit left and 4 units down produces the new position.

CHALLENGE

Dilate by a scale factor of 2 centered at the origin: $A(2,4)$, $B(6,4)$, $C(2,8)$. Rotate 90 degrees counterclockwise about the origin: $A(-4,2)$, $B(-4,6)$, $C(-8,2)$. Then translate 9 units right and 3 units up.

Accept equivalent transformation sequences if they map every listed vertex to its stated image. For rotations and dilations, the center must be identified, and the order of transformations must produce the stated coordinates.