Transform and Match

Use coordinate rules to prove figures are similar.

HIGH SCHOOL · MA.912.GR.2.8

MA.912.GR.2.8 "Apply an appropriate transformation to map one figure onto another to justify that the two figures are similar."

NAME ______________________________ DATE ______________

MAP IT EXACTLY

A dilation multiplies every distance from its center by the same scale factor and preserves angle measures. If a dilation, rigid transformation, or sequence maps every vertex of one figure to another, the figures are similar.

WORKED EXAMPLE

Triangle P(11,12), Q(13,12), and R(11,14) maps to P'(55,60), Q'(65,60), and R'(55,70). Name the transformation.

1. Compare P: (55,60) = 5(11,12).
2. Each vertex coordinate is multiplied by 5.
3. The center is the origin.

Answer: Dilation centered at the origin with scale factor 5. The triangles are similar.

PRACTICE

5 problems

1 Triangle A(1,2), B(3,2), C(1,4) maps to A'(2,4), B'(6,4), C'(2,8). Name the transformation.

ANSWER ______________________________

2 Triangle A(4,1), B(6,1), C(4,3) maps to A'(-1,4), B'(-1,6), C'(-3,4). Name the transformation.

ANSWER ______________________________

3 Triangle J(-3,2), K(-1,2), L(-3,4) maps to J'(3,2), K'(1,2), L'(3,4). Name the transformation.

ANSWER ______________________________

4 Triangle X(1,-2), Y(2,-2), Z(1,1) maps to X'(3,-6), Y'(6,-6), Z'(3,3). Name the transformation.

ANSWER ______________________________

5 Triangle U(1,1), V(4,1), W(1,3) maps to U'(3,2), V'(6,2), W'(3,4). Write the translation rule.

ANSWER ______________________________

APPLY IT Show your work

1 A game designer enlarges a triangular logo with vertices (1,-2), (3,-2), and (1,2). The new logo has vertices (3,-6), (9,-6), and (3,6). What transformation maps the logo to the new logo?

WORK SPACE

ANSWER ______________________

2 A streamer flips a triangular sticker with vertices (2,1), (6,1), and (2,4). The flipped sticker has vertices (2,-1), (6,-1), and (2,-4). What transformation maps the sticker to the flipped sticker?

WORK SPACE

ANSWER ______________________

CHALLENGE One step up

CHALLENGE

Triangle A(2,2), B(4,2), C(2,6) maps to A'(3,-3), B'(3,-6), C'(9,-3). Give a sequence of transformations that maps the first triangle to the second. Explain why the triangles are similar.

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Transform and Match

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Triangle A(1,2), B(3,2), C(1,4) maps to A'(2,4), B'(6,4), C'(2,8). Name the transformation.	**Dilation centered at the origin with scale factor 2.**
2	Triangle A(4,1), B(6,1), C(4,3) maps to A'(-1,4), B'(-1,6), C'(-3,4). Name the transformation.	**Rotation 90 degrees counterclockwise about the origin.**
3	Triangle J(-3,2), K(-1,2), L(-3,4) maps to J'(3,2), K'(1,2), L'(3,4). Name the transformation.	**Reflection across the y-axis.**
4	Triangle X(1,-2), Y(2,-2), Z(1,1) maps to X'(3,-6), Y'(6,-6), Z'(3,3). Name the transformation.	**Dilation centered at the origin with scale factor 3.**
5	Triangle U(1,1), V(4,1), W(1,3) maps to U'(3,2), V'(6,2), W'(3,4). Write the translation rule.	**(x,y) -> (x+2,y+1)**

PART 2 · APPLY IT

1. **A dilation centered at the origin with scale factor 3. The logos are similar.** Each new coordinate is 3 times the original coordinate, so use a dilation with scale factor 3.
2. **Reflection across the x-axis. The stickers are congruent and therefore similar.** The x-coordinates stay the same and each y-coordinate changes sign, which is a reflection across the x-axis.

CHALLENGE

Rotate 90 degrees clockwise about the origin, then dilate centered at the origin with scale factor 3/2. The rotation preserves size and angles, and the dilation multiplies all lengths by 3/2, so the triangles are similar.

Accept equivalent transformation descriptions and coordinate rules. For the challenge, dilation by 3/2 followed by a 90 degree clockwise rotation about the origin is also valid.