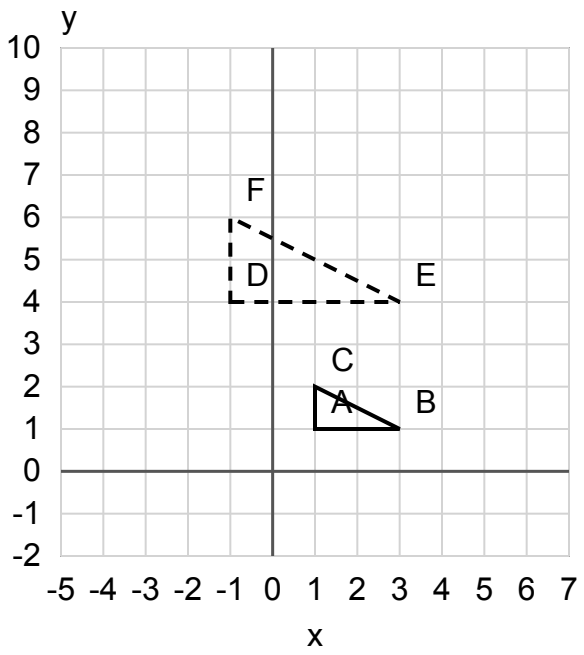
Similarity Mapping on a Coordinate Grid

Use a dilation and a translation to map one similar triangle to another

Name: _____ Date: _____

Part 1 - Notice the Similarity

Triangle ABC is shown with a solid outline. Triangle DEF is shown with a dashed outline. Use the grid and coordinate table to determine which vertices match. Then verify that the same scale factor works for every pair of corresponding sides.



Vertex	Coordinates	Matching vertex
A	(1, 1)	
B	(3, 1)	
C	(1, 2)	

1. Complete the table. For each row, write a corresponding side pair, its two lengths, and target length divided by original length.

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Part 1 - Notice the Similarity (continued)

Original / target side pair	Original length	Target length	Ratio

What is the scale factor from ABC to DEF? What can you say about corresponding angles?

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Part 2 - Describe the Mapping

2. A dilation centered at the origin is followed by a translation. Complete the coordinate record. Then write the full sequence that maps triangle ABC onto triangle DEF. Name the scale factor and translation vector.

Start vertex	After dilation about origin	After translation
A (1, 1)		
B (3, 1)		
C (1, 2)		

Sequence of transformations:

3. Explain why the triangles are similar. Include one fact about side lengths and one fact about angles.

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Answer Key and Teaching Notes

Materials and setup: Print and supply all student pages, keeping teacher-key pages separate. Student pages supply the original and target coordinates and a large coordinate grid. Additionally provide pencils, straightedges, and optional tracing paper. Have students work independently or with a partner after the brief launch. Do not pre-label the matching vertices.

Teaching script: Say, “A similarity mapping may include a dilation and rigid motions. Today, look for one scale factor that works for every matching side. Then use coordinates to describe exactly how one triangle moves to the other.” Point to the solid and dashed outlines. Say, “The letters do not tell you the matches; use position, side lengths, and angles.” After students begin Part 2, say, “Record the image after each transformation, not just the final point.”

Observation method: Circulate with the acceptance criteria: (1) the student consistently matches A-D, B-E, and C-F; (2) the student finds scale factor 2 for all three side pairs; (3) the student records the intermediate dilation image accurately; and (4) the explanation states both proportional sides and congruent corresponding angles. Ask a student who has an error, “Which original side and target side are you comparing?” Do not supply the pair.

1. Answers: A matches D, B matches E, and C matches F. AB corresponds to DE: 2 and 4, ratio 4/2 = 2. AC corresponds to DF: 1 and 2, ratio 2/1 = 2. BC corresponds to EF: sqrt(5) and sqrt(20) = 2sqrt(5), ratio 2sqrt(5)/sqrt(5) = 2. Scale factor is 2. Corresponding angles are congruent: angle A matches angle D, angle B matches angle E, and angle C matches angle F.

2. Answers: Dilate by scale factor 2 centered at the origin: A to (2, 2), B to (6, 2), C to (2, 4). Then translate by <-3, 2>: (2, 2) to (-1, 4) = D; (6, 2) to (3, 4) = E; (2, 4) to (-1, 6) = F. A correct sequence is: “Dilate triangle ABC about the origin by a factor of 2, then translate 3 units left and 2 units up.”

3. Sample response and rubric: “The triangles are similar because each target side is 2 times its corresponding original side, so corresponding sides are proportional. The dilation keeps angle measures the same, and the translation also preserves angles, so corresponding angles are congruent.” Award full credit when both required relationship statements are present and the vertex correspondence is consistent. Accept equivalent precise transformation language and exact-radical or decimal side-length work.

Source credit: New York Next Generation Mathematics Learning Standard NY-8.G.4, task contract reference: https://lessonmakerpro.com/standards/ny-nextgen-math/ny-8-g-4