LESSON MAKER PRO

Transformation Match

Use transformations to show when 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 _____

SIMILARITY MOVES

A dilation multiplies every distance from its center by the same scale factor. A translation, rotation, or reflection keeps all lengths the same, so it maps a figure to a similar figure with scale factor 1. Compare corresponding lengths or coordinates, then name the transformation.

WORKED EXAMPLE

Triangle A'B'C' has corresponding side lengths 15 cm, 36 cm, and 39 cm. Point A is the center and stays fixed. What transformation maps the shown triangle ABC to triangle A'B'C'?



1. Compare corresponding sides: 15/5 = 3.
2. Check another pair: 36/12 = 3.
3. All distances from A are multiplied by 3.

Answer: A dilation centered at A with scale factor 3.

PRACTICE 4 problems

1 Triangle PQR maps to triangle P'Q'R'. P(1, 1), Q(2, 1), and R(1, 4) map to P'(2, 2), Q'(4, 2), and R'(2, 8). Name the transformation and its scale factor.

ANSWER _____

2 Quadrilateral JKLM maps to J'K'L'M'. J(-1, 2), K(-1, 4), L(-4, 4), and M(-4, 2) map to J'(1, 2), K'(1, 4), L'(4, 4), and M'(4, 2). Name the transformation. Why are the figures similar?

ANSWER _____

3 Triangle EFG maps to E'F'G'. E(-4, -2), F(-1, -2), and G(-1, 0) map to E'(-2, 2), F'(1, 2), and G'(1, 4). Name the transformation and its scale factor.

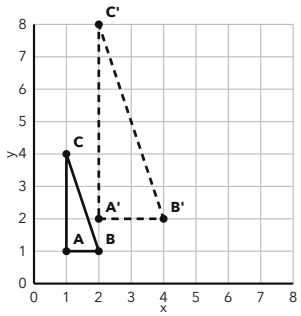
ANSWER _____

4 One triangle has corresponding side lengths 4 cm, 6 cm, and 8 cm. A second triangle has side lengths 7 cm, 21/2 cm, and 14 cm. What scale factor would a dilation use after the figures are aligned?

ANSWER _____

APPLY IT Show your work

1 An esports logo is shown on the coordinate grid. Triangle ABC is the original logo, and triangle A'B'C' is the enlarged logo. What transformation maps the original logo to the enlarged logo?



ANSWER _____

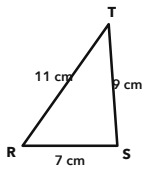
2 A streaming channel uses a 14 cm by 8 cm banner. A smaller 7 cm by 4 cm copy keeps its upper-left corner fixed. What transformation maps the original banner to the smaller copy?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The shown triangle has corresponding side lengths 7 cm, 9 cm, and 11 cm. Another triangle has corresponding side lengths 14 cm, 18 cm, and 23 cm. Can a sequence of rigid transformations and one dilation map the shown triangle onto the other? Explain.



WORK SPACE AND ANSWER

ANSWER KEY

Transformation Match

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Triangle PQR maps to triangle P'Q'R'. P(1, 1), Q(2, 1), and R(1, 4) map to P'(2, 2), Q'(4, 2), and R'(2, 8). Name the transformation and its scale factor.	**Dilation centered at the origin. Scale factor 2.**
2	Quadrilateral JKLM maps to J'K'L'M'. J(-1, 2), K(-1, 4), L(-4, 4), and M(-4, 2) map to J'(1, 2), K'(1, 4), L'(4, 4), and M'(4, 2). Name the transformation. Why are the figures similar?	**Reflection across the y-axis. A reflection has scale factor 1, so the figures are similar.**
3	Triangle EFG maps to E'F'G'. E(-4, -2), F(-1, -2), and G(-1, 0) map to E'(-2, 2), F'(1, 2), and G'(1, 4). Name the transformation and its scale factor.	**Translation 2 units right and 4 units up. Scale factor 1.**
4	One triangle has corresponding side lengths 4 cm, 6 cm, and 8 cm. A second triangle has side lengths 7 cm, 21/2 cm, and 14 cm. What scale factor would a dilation use after the figures are aligned?	**Scale factor 7/4. The triangles are similar because each corresponding side is multiplied by 7/4.**

PART 2 · APPLY IT

1. **A dilation centered at the origin with scale factor 2.** Each image coordinate is twice its original coordinate. A dilation centered at the origin with scale factor 2 maps ABC onto A'B'C'.
2. **A dilation centered at the upper-left corner with scale factor 1/2.** Both dimensions are multiplied by 1/2. Since the upper-left corner stays fixed, it is the center of dilation.

CHALLENGE

No. The first two side ratios are 14/7 = 2 and 18/9 = 2, but 23/11 is not 2. There is no single scale factor, so the triangles are not similar.

Accept equivalent descriptions of translations, such as vector <2, 4>. For dilation items, require both the correct center and scale factor when the center is given or identifiable.