LESSON MAKER PRO

Shape Shift Lab

Test whether two figures are similar.

GRADE 7 · 7A.GM.C.44

7A.GM.C.44 "Given a pair of two-dimensional figures, determine if a series of dilations and rigid motions maps one figure onto the other, recognizing that if such a sequence exists the figures are similar..."

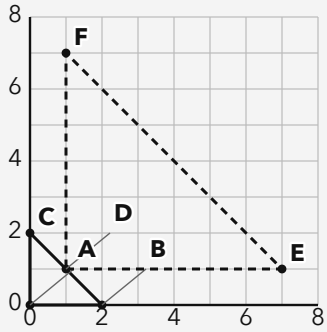
NAME _____ DATE _____

THE BIG IDEA

A dilation multiplies every length by the same scale factor. Translations, rotations, and reflections can move or turn a figure without changing its size or shape. If a dilation and these motions map one figure exactly onto another, the figures are similar.

WORKED EXAMPLE

Can the solid triangle map onto the dashed triangle? Describe a sequence of transformations.

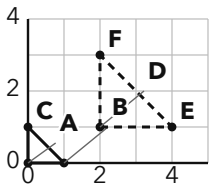


1. The horizontal side grows from 2 units to 6 units, so the scale factor is 3.
2. Dilate about the origin: A(0, 0), B(2, 0), C(0, 2) become (0, 0), (6, 0), (0, 6).
3. Translate 1 unit right and 1 unit up to reach D, E, and F.

Answer: Yes. Dilate by a factor of 3 about the origin, then translate 1 unit right and 1 unit up.

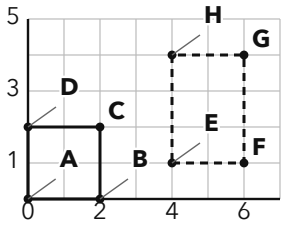
PRACTICE 6 problems

1 Can the solid triangle map onto the dashed triangle? If so, give a dilation about the origin followed by a translation.



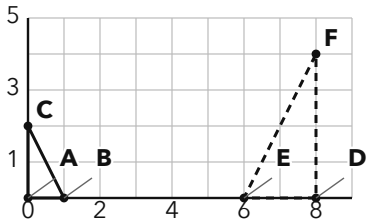
ANSWER _____

2 Can the solid figure map onto the dashed figure through a dilation and rigid motions? Use side lengths to explain.



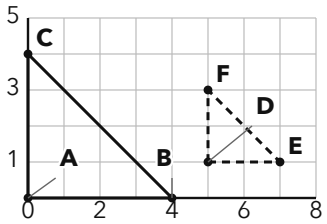
ANSWER _____

3 Can the solid triangle map onto the dashed triangle? If so, give a dilation about the origin followed by a reflection.



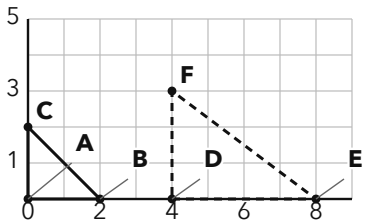
ANSWER _____

4 Can the solid triangle map onto the dashed triangle? If so, give a dilation about the origin followed by a translation.



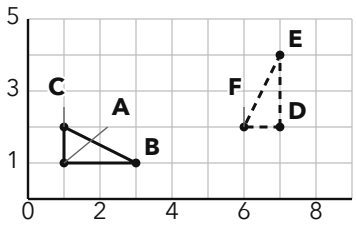
ANSWER _____

5 Can the solid triangle map onto the dashed triangle through a dilation and rigid motions? Use side lengths to explain.



ANSWER _____

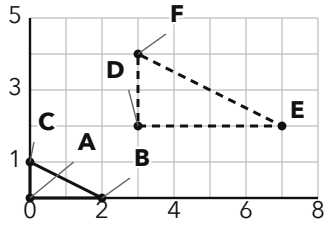
6 Can the solid triangle map onto the dashed triangle without a dilation? If so, describe a rotation about the origin followed by a translation.



ANSWER _____

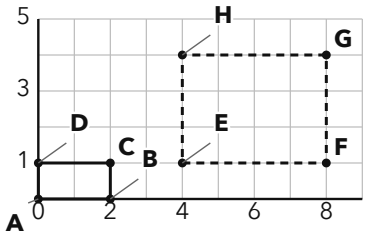
APPLY IT Show your work

1 A game designer enlarges the solid player icon to make the dashed icon. Are the icons similar? Describe a dilation about the origin followed by a translation that maps one onto the other.



ANSWER _____

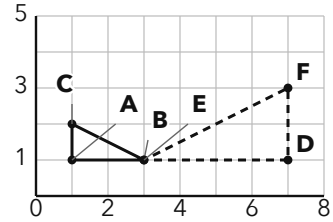
2 A student changes the solid icon into the dashed icon for a gaming club banner. Are the icons similar? Explain using side lengths.



ANSWER _____

CHALLENGE One step up

Map the solid triangle onto the dashed triangle. Describe a sequence that starts with a dilation about the origin, then reflects across a vertical line, and ends with a translation. Give the scale factor, reflection line, and translation.



WORK SPACE AND ANSWER

ANSWER KEY

Shape Shift Lab

GRADE 7 · 7A.GM.C.44

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Can the solid triangle map onto the dashed triangle? If so, give a dilation about the origin followed by a translation.	**Yes. Dilate by a factor of 2 about the origin, then translate 2 units right and 1 unit up.**
2	Can the solid figure map onto the dashed figure through a dilation and rigid motions? Use side lengths to explain.	**No. The solid figure has equal side lengths, but the dashed figure has sides of 2 and 3 units. One scale factor cannot produce both.**
3	Can the solid triangle map onto the dashed triangle? If so, give a dilation about the origin followed by a reflection.	**Yes. Dilate by a factor of 2 about the origin, then reflect across the line x = 4.**
4	Can the solid triangle map onto the dashed triangle? If so, give a dilation about the origin followed by a translation.	**Yes. Dilate by a factor of 1/2 about the origin, then translate 5 units right and 1 unit up.**
5	Can the solid triangle map onto the dashed triangle through a dilation and rigid motions? Use side lengths to explain.	**No. The solid triangle's legs are both 2 units, while the dashed triangle's legs are 4 and 3 units. No single scale factor maps both legs.**
6	Can the solid triangle map onto the dashed triangle without a dilation? If so, describe a rotation about the origin followed by a translation.	**Yes. Rotate 90° counterclockwise about the origin, then translate 8 units right and 1 unit up.**

PART 2 · APPLY IT

1. **Yes. Dilate by a factor of 2 about the origin, then translate 3 units right and 2 units up.** Each side of the dashed icon is twice the matching side of the solid icon. After dilation about the origin, a translation of 3 units right and 2 units up matches the vertices.
2. **No. The horizontal sides double from 2 to 4 units, but the vertical sides triple from 1 to 3 units.** The matching side lengths do not have one scale factor, so no sequence of dilations and rigid motions maps one icon onto the other.

CHALLENGE

Dilate by a factor of 2 about the origin, reflect across the line x = 4, then translate 1 unit right and 1 unit down.

Accept any valid transformation sequence that maps every corresponding vertex. For explanations of non-similarity, accept equivalent comparisons of side-length ratios.