LESSON MAKER PRO

# Shape Shift

*Test similarity with dilations and rigid motions.*

**GRADE 8 · 8.GM.A.24**

**8.GM.A.24** "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..."

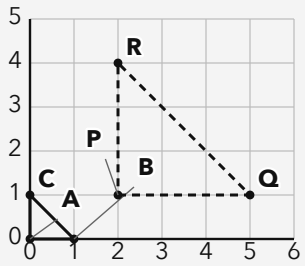
NAME _____ DATE _____

## THE BIG IDEA

Similar figures can be matched by a dilation and rigid motions, such as a translation, rotation, or reflection. Match corresponding vertices in order to check a sequence.

## WORKED EXAMPLE

Can solid ABC map onto dashed PQR? Give a sequence.




1. Dilate ABC by 3 about the origin.
2. Translate the result 2 units right and 1 unit up.
3. The vertices land on P, Q, and R.

**Answer: Yes. Dilate by 3 about the origin, then translate 2 units right and 1 unit up.**

## PRACTICE 4 problems

**1** ABC: A(0,0), B(2,0), C(0,1). PQR: P(1,1), Q(5, 1), R(1,3). Are they similar? Give a sequence.

**ANSWER** _____

**2** ABCD: A(0,0), B(4,0), C(4,2), D(0,2). PQRS: P(0,0), Q(2,0), R(2,1), S(0,1). Are they similar? Give a sequence.

**ANSWER** _____

**3** ABC: A(0,0), B(2,0), C(0,2). PQR: P(0,0), Q(4, 0), R(0,6). Are they similar? Explain briefly.

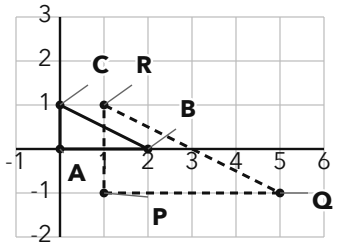
**ANSWER** _____

**4** ABC: A(0,0), B(2,0), C(0,2). PQR: P(4,1), Q(4, 5), R(0,1). Are they similar? Give a sequence.

**ANSWER** _____

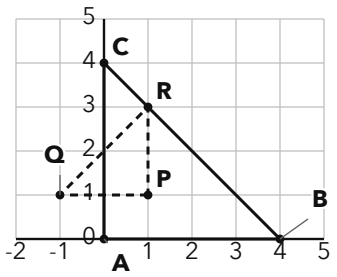
## APPLY IT Show your work

**1** A game designer changes a badge from solid ABC to dashed PQR. Are the badges similar? Give a sequence.




**ANSWER** _____

**2** An app flips and shrinks an emoji outline from solid ABC to dashed PQR. Are the outlines similar? Give a sequence.




**ANSWER** _____

## CHALLENGE One step up

ABC has A(0,0), B(2,0), C(0,1). Its image has P(3,2), Q(3,6), R(x,2). Dilate by 2 about the origin, then rotate 90° counterclockwise about the origin. Find x and the final translation that maps ABC onto PQR.

WORK SPACE AND ANSWER

# Shape Shift



## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | ABC: A(0,0), B(2,0), C(0,1). PQR: P(1,1), Q(5,1), R(1,3). Are they similar? Give a sequence. | **Yes. Dilate ABC by 2 about the origin, then translate 1 unit right and 1 unit up.** |
| 2 | ABCD: A(0,0), B(4,0), C(4,2), D(0,2). PQRS: P(0,0), Q(2,0), R(2,1), S(0,1). Are they similar? Give a sequence. | **Yes. Dilate ABCD by 1/2 about the origin.** |
| 3 | ABC: A(0,0), B(2,0), C(0,2). PQR: P(0,0), Q(4,0), R(0,6). Are they similar? Explain briefly. | **No. AB to PQ has scale factor 2, but AC to PR has scale factor 3.** |
| 4 | ABC: A(0,0), B(2,0), C(0,2). PQR: P(4,1), Q(4,5), R(0,1). Are they similar? Give a sequence. | **Yes. Dilate ABC by 2 about the origin, rotate 90° counterclockwise about the origin, then translate 4 units right and 1 unit up.** |

## PART 2 · APPLY IT

1. **Yes. Dilate by 2 about the origin, then translate 1 unit right and 1 unit down.** The dashed side lengths are twice the matching solid side lengths. After dilation, each vertex moves 1 unit right and 1 unit down.
2. **Yes. Reflect across the y-axis, dilate by 1/2 about the origin, then translate 1 unit right and 1 unit up.** Reflecting and dilating sends B to (-2,0) and C to (0,2). Translating by (1,1) matches all three dashed vertices.

## CHALLENGE

**x = 1. Translate 3 units right and 2 units up.**

Accept any valid sequence that maps corresponding vertices onto one another. For the challenge, the stated dilation and rotation occur before the translation.