

Move, Match, Scale

Use transformations to compare figures.

GRADE 8 • MA.8.GR.2

MA.8.GR.2 "Understand similarity and congruence using models and transformations."

NAME _____

DATE _____

TRANSFORMATION RULES

A translation, reflection, or rotation keeps all lengths and angle measures the same, so the image is congruent to the original. A dilation multiplies every length by the scale factor k . When k is not 1, the figures are similar but not congruent.

WORKED EXAMPLE

A segment is 7 units long. It is dilated by a scale factor of 3. What is the image length?

1. Image length = scale factor $\times$ original length.
2. Image length = 3×7 .
3. Image length = 21 units.

Answer: 21 units

PRACTICE 6 problems

- 1** A square with side length 4 units is dilated by a scale factor of 2. What is the image side length?

ANSWER _____

- 2** A dilation maps a 5-unit segment to a 20-unit segment. Find the scale factor.

ANSWER _____

- 3** Triangle RST is similar to triangle XYZ. $RS = 6$, $XY = 15$, and $ST = 8$. Find YZ .

ANSWER _____

- 4** Point $P(-5, 8)$ is translated 4 units right and 6 units down. What are the coordinates of P' ?

ANSWER _____

- 5** Point $Q(9, -4)$ is reflected across the y -axis. What are the coordinates of Q' ?

ANSWER _____

- 6** Triangle ABC has vertices $A(4, 2)$, $B(8, 2)$, and $C(4, 6)$. Translate the triangle 6 units left and 4 units up. List the image vertices.

ANSWER _____

APPLY IT Show your work

- 1** A gaming club enlarges its logo for a tournament poster. The original logo is 16 cm tall and 10 cm wide. The club uses a dilation with scale factor $\frac{5}{2}$. What are the dimensions of the enlarged logo?

WORK SPACE

ANSWER _____

- 2** For a hallway mural, a design tile has vertices $(1, 4)$, $(5, 4)$, and $(1, 9)$. The artist slides the tile 8 units right and 5 units down. What are the new vertices, and is the image congruent to the original tile?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A game map triangle has vertices $A(1, 2)$, $B(5, 2)$, and $C(1, 6)$. First, dilate the triangle about the origin by a scale factor of 2. Then translate it 6 units right and 8 units down. List the final vertices. Is the final triangle congruent to the original, or similar but not congruent? Explain your reasoning.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A square with side length 4 units is dilated by a scale factor of 2. What is the image side length?	8 units
2	A dilation maps a 5-unit segment to a 20-unit segment. Find the scale factor.	4
3	Triangle RST is similar to triangle XYZ. $RS = 6$, $XY = 15$, and $ST = 8$. Find YZ.	20
4	Point P(-5, 8) is translated 4 units right and 6 units down. What are the coordinates of P'?	(-1, 2)
5	Point Q(9, -4) is reflected across the y-axis. What are the coordinates of Q'?	(-9, -4)
6	Triangle ABC has vertices A(4, 2), B(8, 2), and C(4, 6). Translate the triangle 6 units left and 4 units up. List the image vertices.	A'(-2, 6), B'(2, 6), C'(-2, 10)

PART 2 • APPLY IT

- 40 cm tall and 25 cm wide** Multiply each original dimension by $\frac{5}{2}$. The height is $16 \times \frac{5}{2} = 40$, and the width is $10 \times \frac{5}{2} = 25$.
- (9, -1), (13, -1), and (9, 4); congruent** Add 8 to each x-coordinate and subtract 5 from each y-coordinate. A translation preserves lengths and angle measures, so the image is congruent.

CHALLENGE

A''(8, -4), B''(16, -4), C''(8, 4). The final triangle is similar but not congruent because the dilation has scale factor 2, so all side lengths are doubled.

Accept ordered pairs written with commas and parentheses. For the challenge, accept equivalent explanations that state the dilation changes side lengths, so the figures are not congruent.