

Scale Factor Sleuths

Use matching measurements to find each dilation factor.

GRADE 8 • MA.8.GR.2.2

MA.8.GR.2.2 "Given a preimage and image generated by a single dilation, identify the scale factor that describes the relationship."

NAME _____

DATE _____

FIND THE MULTIPLIER

To find the scale factor, divide a measurement in the image by the matching measurement in the preimage. Use $k = \text{image measurement} / \text{preimage measurement}$. A scale factor greater than 1 makes a larger image, and a scale factor between 0 and 1 makes a smaller image.

WORKED EXAMPLE

A segment is 16 units long in the preimage and 28 units long in the image. Find the scale factor k .

1. Write image / preimage: $k = 28/16$.
2. Simplify $28/16$ by dividing both numbers by 4.
3. $k = 7/4$.

Answer: $k = 7/4$

PRACTICE 6 problems

- 1** Segment AB is 4 cm long. Its image, A'B', is 20 cm long. Find k .

ANSWER _____

- 2** A triangle has a side length of 18 units in the preimage and 6 units in the image. Find k .

ANSWER _____

- 3** A dilation centered at the origin maps Q(-5, 9) to Q'(-15, 27). Find k .

ANSWER _____

- 4** A rectangle has side lengths 7 cm and 11 cm. Its image has matching side lengths 21 cm and 33 cm. Find k .

ANSWER _____

- 5** A quadrilateral side is 24 mm in the preimage and 9 mm in the image. Find k .

ANSWER _____

- 6** A dilation centered at the origin maps R(12, -4) to R'(3, -1). Find k .

ANSWER _____

APPLY IT Show your work

- 1** A gaming club makes a smaller sticker from its 45 cm wide team-logo design. The sticker image is 30 cm wide. What scale factor maps the logo design to the sticker?

WORK SPACE

ANSWER _____

- 2** A student enlarges a 25 cm sneaker sketch for a hallway display. The enlarged image is 40 cm wide. What scale factor maps the sketch to the display image?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A preimage triangle has side lengths 12 cm, 18 cm, and 30 cm. Its image has side lengths 8 cm, 12 cm, and 20 cm. Find k and explain how you know the same dilation maps the preimage to the image.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Segment AB is 4 cm long. Its image, A'B', is 20 cm long. Find k.	k = 5
2	A triangle has a side length of 18 units in the preimage and 6 units in the image. Find k.	k = 1/3
3	A dilation centered at the origin maps Q(-5, 9) to Q'(-15, 27). Find k.	k = 3
4	A rectangle has side lengths 7 cm and 11 cm. Its image has matching side lengths 21 cm and 33 cm. Find k.	k = 3
5	A quadrilateral side is 24 mm in the preimage and 9 mm in the image. Find k.	k = 3/8
6	A dilation centered at the origin maps R(12, -4) to R'(3, -1). Find k.	k = 1/4

PART 2 • APPLY IT

1. **k = 2/3** Divide the image width by the preimage width: $30/45 = 2/3$.
2. **k = 8/5** Divide the image width by the preimage width: $40/25 = 8/5$.

CHALLENGE

k = 2/3. Each image side is 2/3 of its matching preimage side: $8/12 = 12/18 = 20/30 = 2/3$.

Accept equivalent fractions for fractional scale factors, such as $6/9$ for $2/3$. For coordinate problems, students may compare either corresponding x-coordinates or corresponding y-coordinates.