LESSON MAKER PRO

Size Shift

Use scale factors to find lengths and areas.

GRADE 7 · 7.GM.4

7.GM.4 "Analyze the effect of translations, reflections, rotations, and dilations on the attributes of two-dimensional figures on and off the coordinate plane. Describe the properties of similarity, compare geometric figures for similarity..."

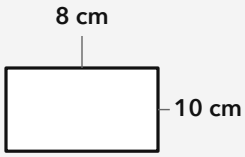
NAME _____ DATE _____

THE BIG IDEA

A dilation with scale factor k multiplies every side length by k. It multiplies area by k^2. Matching angles stay the same, so the original figure and its image are similar.

WORKED EXAMPLE

The rectangle shown is dilated by a scale factor of 3/2. Find the image's side lengths and area.

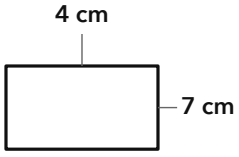


1. Multiply the first side: 8 × 3/2 = 12 cm.
2. Multiply the second side: 10 × 3/2 = 15 cm.
3. Find the image's area: 12 × 15 = 180 cm^2.

Answer: The side lengths are 12 cm and 15 cm. The area is 180 cm^2.

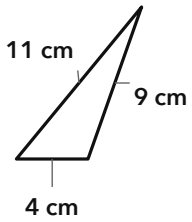
PRACTICE 6 problems

1 Dilate the rectangle shown by a scale factor of 3. What are the image's side lengths?



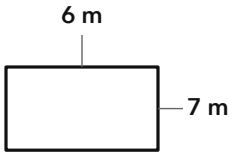
ANSWER _____

2 Dilate the triangle shown by a scale factor of 3. What is the image's perimeter?



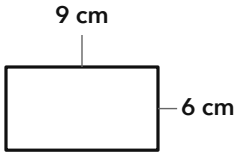
ANSWER _____

3 Dilate the rectangle shown by a scale factor of 2. What is the image's area?



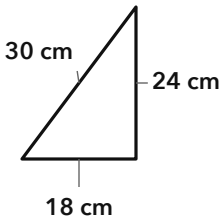
ANSWER _____

4 The side labeled 9 cm corresponds to a 3 cm side of a smaller rectangle. What is the scale factor from the smaller rectangle to the one shown?



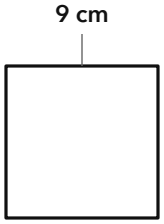
ANSWER _____

5 Dilate the triangle shown by a scale factor of 1/3. What is the image's shortest side length?



ANSWER _____

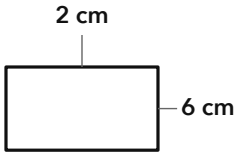
6 A square similar to the one shown has an area of 36 cm^2. What is the scale factor from the shown square to the new square?



ANSWER _____

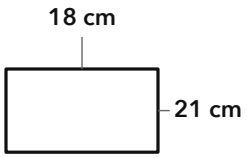
APPLY IT Show your work

1 A student makes the plan shown for a dance floor at a school festival. Each 1 cm on the plan represents 3 m on the real floor. What are the floor's side lengths and area?



ANSWER _____

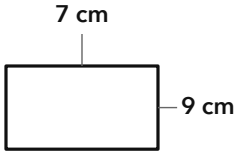
2 For a school art show, a student reduces the rectangular design shown by a scale factor of 1/3 to make a small print. What are the print's side lengths and area?



ANSWER _____

CHALLENGE One step up

The rectangle shown is enlarged to an area of 252 cm^2. Find the scale factor and both new side lengths. Explain how the area helps you find the scale factor.



WORK SPACE AND ANSWER

ANSWER KEY # Size Shift

GRADE 7 · 7.GM.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Dilate the rectangle shown by a scale factor of 3. What are the image's side lengths?	**12 cm and 21 cm**
2	Dilate the triangle shown by a scale factor of 3. What is the image's perimeter?	**72 cm**
3	Dilate the rectangle shown by a scale factor of 2. What is the image's area?	**168 m^2**
4	The side labeled 9 cm corresponds to a 3 cm side of a smaller rectangle. What is the scale factor from the smaller rectangle to the one shown?	**3**
5	Dilate the triangle shown by a scale factor of 1/3. What is the image's shortest side length?	**6 cm**
6	A square similar to the one shown has an area of 36 cm^2. What is the scale factor from the shown square to the new square?	**2/3**

PART 2 · APPLY IT

1. **6 m by 18 m; 108 m^2** Multiply each plan length by 3 to get 6 m and 18 m. Multiply the actual lengths to get an area of 108 m^2.
2. **6 cm by 7 cm; 42 cm^2** Multiply each side by 1/3 to get 6 cm and 7 cm. The print's area is 6 × 7 = 42 cm^2.

CHALLENGE

The original area is 7 × 9 = 63 cm^2. The area is multiplied by 252/63 = 4, so the scale factor is 2 because $2^2 = 4$. The new side lengths are 14 cm and 18 cm.

Accept side lengths in either order. For the challenge, accept any explanation that distinguishes the area multiplier of 4 from the side-length multiplier of 2.