LESSON MAKER PRO

Scale It Up

Use scale factors to track a figure and its dilation.

GRADE 8 · TEKS 8.3

8.3 "Proportionality. The student applies mathematical process standards to use proportional relationships to describe dilations. The student is expected to: generalize that the ratio of corresponding sides of similar shapes are proportional..."

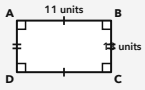
NAME _____ DATE _____

THE BIG IDEA

For a positive scale factor k, multiply every coordinate by k: (x, y) becomes (kx, ky). Corresponding side lengths have the same ratio, while angle measures and shape stay the same. If k is less than 1, the image is smaller. If k is greater than 1, the image is larger.

WORKED EXAMPLE

A game club scales the rectangular sign shown by k = 2/3. Find the two image side lengths.



1. Use k = 2/3.
2. 11(2/3) = 22/3.
3. 13(2/3) = 26/3.
4. Both image-to-original side ratios are 2/3.

Answer: The image side lengths are 22/3 units and 26/3 units.

PRACTICE 4 problems

1 A theater club enlarges a triangular backdrop with side lengths 5 cm, 7 cm, and 9 cm by k = 2. What are the new side lengths? How can you check the dilation?

ANSWER _____

2 A dance app dilates a triangle about the origin by k = 1/2. Its vertices are A(2, -3), B(4, -1), and C(1, 1). Find A', B', and C'.

ANSWER _____

3 A robotics team moves a sensor marker at (-8, 12) using a dilation centered at the origin with k = 3/4. Find the image point. Does it stay on the same ray from the origin?

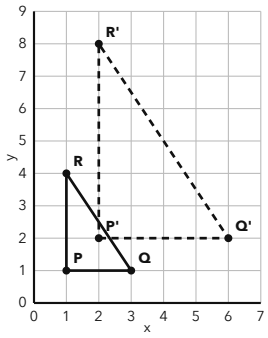
ANSWER _____

4 A photo-editing app scales a square icon with side length 12 pixels by k = 1/4. What are the image side length and image area?

ANSWER _____

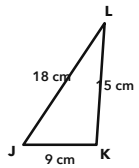
APPLY IT Show your work

1 A student doubles a triangular patch for a game banner. The solid triangle is the original patch, and the dashed triangle is the printed patch. What is the scale factor? Name one attribute that stays the same and one that changes.



ANSWER _____

2 A music festival uses the triangular pennant shown for a small stage sign. A printer makes a copy with k = 1/3. What are the new side lengths and the new perimeter?



ANSWER _____

CHALLENGE One step up

An animation team dilates a rectangular logo about the origin by k = 1/3. The original vertices are (-6, 9), (3, 9), (3, -3), and (-6, -3). A teammate says the image perimeter is 10 units and the image area is 12 square units. Is each claim correct? Explain.

WORK SPACE AND ANSWER

ANSWER KEY

Scale It Up

GRADE 8 · TEKS 8.3

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A theater club enlarges a triangular backdrop with side lengths 5 cm, 7 cm, and 9 cm by k = 2. What are the new side lengths? How can you check the dilation?	**10 cm, 14 cm, and 18 cm. Each image side divided by its matching original side equals 2.**
2	A dance app dilates a triangle about the origin by k = 1/2. Its vertices are A(2, -3), B(4, -1), and C(1, 1). Find A', B', and C'.	**A'(1, -3/2), B'(2, -1/2), C'(1/2, 1/2)**
3	A robotics team moves a sensor marker at (-8, 12) using a dilation centered at the origin with k = 3/4. Find the image point. Does it stay on the same ray from the origin?	**(-6, 9). Yes, it stays on the same ray from the origin.**
4	A photo-editing app scales a square icon with side length 12 pixels by k = 1/4. What are the image side length and image area?	**The image side length is 3 pixels, and the image area is 9 square pixels.**

PART 2 · APPLY IT

1. **The scale factor is 2. Corresponding angle measures stay the same, and each corresponding side length doubles.** Compare matching coordinates, such as P(1, 1) and P'(2, 2), to find k = 2. A dilation preserves angle measures and multiplies all side lengths by k.
2. **The new side lengths are 3 cm, 5 cm, and 6 cm. The new perimeter is 14 cm.** Multiply each side length by 1/3, then add the three image side lengths.

CHALLENGE

The perimeter claim is false. The original rectangle is 9 units by 12 units, so the image is 3 units by 4 units and has perimeter 14 units. The area claim is true because the image area is 3 times 4, or 12 square units.

Accept equivalent fractional or decimal coordinate forms. For explanations, accept any correct statement that angle measures are preserved and corresponding lengths are multiplied by the scale factor.