LESSON MAKER PRO

Scale It Right

Use scale factors to find dilated segment lengths.

HIGH SCHOOL · HSG-SRT.A.1b

CCSS.Math.Content.HSG-SRT.A.1b "The dilation of a line segment is longer or shorter in the ratio given by the scale factor."

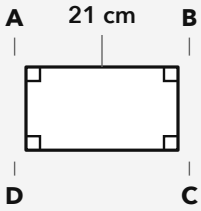
NAME _____ DATE _____

HOW LENGTHS CHANGE

In a dilation, multiply the original segment length by the scale factor to find the image length. A scale factor greater than 1 makes a segment longer, and a scale factor between 0 and 1 makes a segment shorter.

WORKED EXAMPLE

The labeled side of the rectangle shown is dilated by a scale factor of 5/7. Find the length of that side in the image.

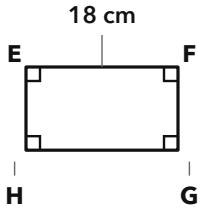


1. Original side length = 21 cm.
2. Multiply by the scale factor: 21 x 5/7.
3. 21 x 5/7 = 15.

Answer: 15 cm

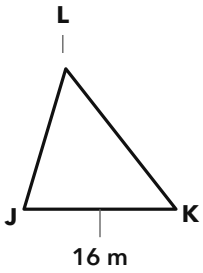
PRACTICE 6 problems

1 The labeled side of the rectangle shown is dilated by a scale factor of 1/6. What is the length of that side in the image?



ANSWER _____

2 The labeled side of the triangle shown is dilated by a scale factor of 1/8. What is the length of that side in the image?



ANSWER _____

3 An original segment is 24 cm long. It is dilated by a scale factor of 1/4. Find the image length.

ANSWER _____

4 An image segment is 27 cm long after a dilation with scale factor 9/6. Find the original segment length.

ANSWER _____

5 A segment with original length 32 units is dilated by a scale factor of 11/16. Find the image length.

ANSWER _____

6 A segment with original length 48 cm has an image length of 36 cm. Find the scale factor.

ANSWER _____

APPLY IT Show your work

1 A student filmmaker makes a title banner that is 36 cm wide. For a video thumbnail, the banner is dilated by a scale factor of 3/4. How wide is the thumbnail banner?

WORK SPACE

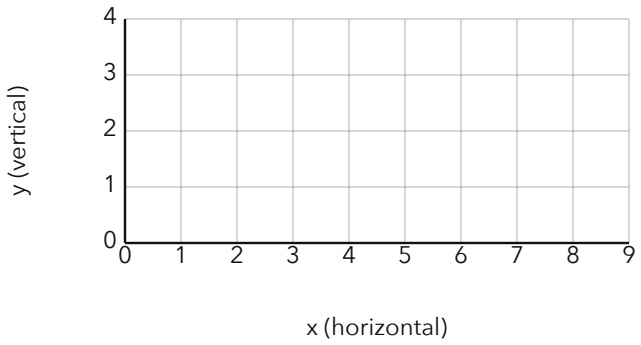
ANSWER _____

2 A game designer enlarges a 24 mm app icon by a scale factor of 9/8 for a promotional screen. What is the new width of the icon?

WORK SPACE

ANSWER _____

3 Experiment on the blank grid. The teacher supplies a ruler. Plot center O=(0,0), A(1,1) and B(4,1), and draw AB. Construct a dilation with center O and scale factor 2: put each image point on the ray from O through its original point at twice the distance from O. Connect and label A′B′. Measure AB and A′B′ with the ruler; record both readings in the same unit. Divide the image reading by the original reading and compare the observed ratio with 2. Use extra paper if needed.



ANSWER _____

CHALLENGE One step up

A 72 cm segment is first dilated by a scale factor of 2/3. The image is then dilated by a scale factor of 9/8. Find the combined scale factor and the final segment length. Show how the two scale factors combine.

WORK SPACE AND ANSWER

ANSWER KEY # Scale It Right

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The labeled side of the rectangle shown is dilated by a scale factor of 1/6. What is the length of that side in the image?	**3 cm**
2	The labeled side of the triangle shown is dilated by a scale factor of 1/8. What is the length of that side in the image?	**2 m**
3	An original segment is 24 cm long. It is dilated by a scale factor of 1/4. Find the image length.	**6 cm**
4	An image segment is 27 cm long after a dilation with scale factor 9/6. Find the original segment length.	**18 cm**
5	A segment with original length 32 units is dilated by a scale factor of 11/16. Find the image length.	**22 units**
6	A segment with original length 48 cm has an image length of 36 cm. Find the scale factor.	**3/4**

PART 2 · APPLY IT

1. **27 cm** Multiply the original width by the scale factor: 36 x 3/4 = 27.
2. **27 mm** Multiply the original width by the scale factor: 24 x 9/8 = 27.
3. **A′(2,2), B′(8,2); AB=3 grid units, A′B′=6 grid units; measured ratio approximately 2.** Each image point lies on its original ray from O with doubled distance. The image segment is twice as long. Require actual constructed segments and recorded ruler readings, accepting reasonable measurement tolerance. Centimeter readings depend on print size but their ratio should be approximately 2.

CHALLENGE

Combined scale factor: 3/4; final segment length: 54 cm

Accept equivalent fractions for scale factors, such as 6/8 for 3/4. Students should multiply the original length by each scale factor, including both factors in the challenge. For Apply 3, check actual specified-center construction and recorded original/image measurements with observed ratio; multiplication alone does not complete the experimental task.

Apply 3: center O; original AB and dilation A′B′ with scale factor 2. Lengths are 3 and 6 grid units.

