

Scale It Up

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 _____

LENGTH CHANGES IN A DILATION

A dilation changes a segment length by multiplying the original length by the scale factor. A scale factor greater than 1 makes the segment longer, while a scale factor between 0 and 1 makes it shorter.

WORKED EXAMPLE

A segment is 32 cm long and is dilated by a scale factor of $\frac{5}{8}$. Find its new length.

1. new length = scale factor $\times$ original length

2. new length = $\frac{5}{8} \times 32$

3. new length = 20 cm

Answer: 20 cm

PRACTICE 6 problems

- 1** A segment is 24 units long. It is dilated by a scale factor of $\frac{3}{4}$. Find the image length.

ANSWER _____

- 2** A segment is 28 mm long. It is dilated by a scale factor of $\frac{1}{4}$. Find the image length.

ANSWER _____

- 3** A segment with length 12 units is dilated to a length of 48 units. What is the scale factor?

ANSWER _____

- 4** A segment of length x is dilated by a scale factor of 3. Its image has length 39 cm. Find x .

ANSWER _____

- 5** A segment is 30 inches long. It is dilated by a scale factor of $\frac{1}{5}$. Find the image length.

ANSWER _____

- 6** A segment with length 27 units is dilated to a length of 9 units. What is the scale factor?

ANSWER _____

APPLY IT Show your work

- 1** For a student film, a prop designer makes a scale model of a stage. A 18-foot wall in the real stage is represented by a segment that is dilated by a scale factor of $\frac{1}{3}$. How long is the model wall?

WORK SPACE

ANSWER _____

- 2** An esports club enlarges a logo edge from 15 cm to 45 cm for a tournament banner. What scale factor did the club use?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Segment AB is 25 units long. First, it is dilated by a scale factor of $\frac{3}{5}$. Then its image is dilated by a scale factor of 4. What is the final length? Explain how the two scale factors affect the original length.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A segment is 24 units long. It is dilated by a scale factor of $\frac{3}{4}$. Find the image length.	18 units
2	A segment is 28 mm long. It is dilated by a scale factor of $\frac{1}{4}$. Find the image length.	7 mm
3	A segment with length 12 units is dilated to a length of 48 units. What is the scale factor?	4
4	A segment of length x is dilated by a scale factor of 3. Its image has length 39 cm. Find x .	13 cm
5	A segment is 30 inches long. It is dilated by a scale factor of $\frac{1}{5}$. Find the image length.	6 inches
6	A segment with length 27 units is dilated to a length of 9 units. What is the scale factor?	$\frac{1}{3}$

PART 2 • APPLY IT

1. **6 feet** Multiply the original wall length by the scale factor: $\frac{1}{3} \times 18 = 6$. The model wall is 6 feet long.
2. **3** Divide the image length by the original length: $45 \div 15 = 3$. The logo was enlarged by a scale factor of 3.

CHALLENGE

60 units. The combined scale factor is $\frac{3}{5} \times 4 = \frac{12}{5}$, and $25 \times \frac{12}{5} = 60$.

Accept equivalent fractional forms for scale factors. For the challenge, accept work that finds the first image length as 15 units and then multiplies by 4.