

Scale Shift Studio

Use scale factors to resize drawings and designs.

GRADE 7 • 7.MG.4.c

7.MG.4.c "Identify and describe dilations in context including, but not limited to, scale drawings and graphic design."

NAME _____

DATE _____

RESIZE WITH A SCALE FACTOR

A dilation changes a figure's size by multiplying every length by the same scale factor. A scale factor greater than 1 makes an enlargement, while a scale factor between 0 and 1 makes a reduction. Divide the image length by the original length to find an unknown scale factor.

WORKED EXAMPLE

A triangle side is 8 cm long. It is dilated by a scale factor of $\frac{3}{2}$. Find the new side length.

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

2. New length = $8 \times \frac{3}{2}$.

3. New length = 12 cm.

Answer: 12 cm, an enlargement

PRACTICE 6 problems

- 1** A 10 cm segment becomes 15 cm after a dilation. What is the scale factor, and is the dilation an enlargement or a reduction?

ANSWER _____

- 2** A 21 cm line segment is dilated by a scale factor of $\frac{2}{3}$. What is the image length?

ANSWER _____

- 3** A polygon has an original side length of 27 cm and an image side length of 9 cm. What is the scale factor, and is the dilation an enlargement or a reduction?

ANSWER _____

- 4** On a scale drawing, an actual path that is 35 m long is shown after a dilation with a scale factor of $\frac{1}{5}$. How long is the path on the drawing?

ANSWER _____

- 5** A logo is 15 mm wide. It is dilated to become 20 mm wide. What is the scale factor, and is the dilation an enlargement or a reduction?

ANSWER _____

- 6** A photo is 24 cm tall and is dilated by a scale factor of $\frac{1}{4}$. Find the new height and describe the dilation.

ANSWER _____

APPLY IT Show your work

- 1** A student designs a scale drawing for a game-club banner. The actual banner is 36 inches long, and the drawing uses a scale factor of $\frac{1}{4}$. How long is the banner in the drawing? Is this an enlargement or a reduction?

WORK SPACE

ANSWER _____

- 2** For a music playlist cover, a rectangular graphic is 21 cm wide and 15 cm high. It is enlarged by a scale factor of $\frac{4}{3}$. What are the new dimensions?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A mural sketch has a side length of 25 cm. It is first reduced by a scale factor of $\frac{1}{3}$, then the reduced image is enlarged by a scale factor of 6. What is the final side length? What single scale factor describes the overall dilation? Explain your reasoning.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A 10 cm segment becomes 15 cm after a dilation. What is the scale factor, and is the dilation an enlargement or a reduction?	Scale factor $3/2$, enlargement
2	A 21 cm line segment is dilated by a scale factor of $2/3$. What is the image length?	14 cm
3	A polygon has an original side length of 27 cm and an image side length of 9 cm. What is the scale factor, and is the dilation an enlargement or a reduction?	Scale factor $1/3$, reduction
4	On a scale drawing, an actual path that is 35 m long is shown after a dilation with a scale factor of $1/5$. How long is the path on the drawing?	7 m
5	A logo is 15 mm wide. It is dilated to become 20 mm wide. What is the scale factor, and is the dilation an enlargement or a reduction?	Scale factor $4/3$, enlargement
6	A photo is 24 cm tall and is dilated by a scale factor of $1/4$. Find the new height and describe the dilation.	6 cm, reduction

PART 2 • APPLY IT

- 9 inches, reduction** Multiply the actual length by the scale factor: $36 \times 1/4 = 9$. Since $1/4$ is less than 1, the drawing is a reduction.
- 28 cm wide and 20 cm high** Multiply each dimension by $4/3$: $21 \times 4/3 = 28$ and $15 \times 4/3 = 20$. The new graphic is 28 cm by 20 cm.

CHALLENGE

50 cm; overall scale factor 2, so the overall dilation is an enlargement because $1/3 \times 6 = 2$.

Accept equivalent scale factors written as fractions or decimals, such as 0.25 for $1/4$. Require students to identify scale factors greater than 1 as enlargements and scale factors between 0 and 1 as reductions.