LESSON MAKER PRO

Scale It Up

Model how size changes affect area and volume.

HIGH SCHOOL · MT.CORE.GEOM.MEAS.4.c

MT.CORE.GEOM.MEAS.4.c "Use geometric shapes, their measures, and their properties to model objects and use those models to solve problems in context. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities..."

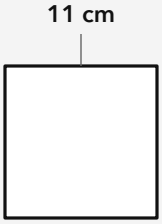
NAME _____ DATE _____

THE SCALE FACTOR RULE

Similar figures have matching shapes, but their sizes can differ. Multiply lengths and perimeters by the scale factor, areas by its square, and volumes by its cube.

WORKED EXAMPLE

The square tile shown is enlarged by a scale factor of 5. What is its new area?



1. Original area: $11 \times 11 = 121$ cm^2.
2. Area factor: $5^2 = 25$.
3. New area: $121 \times 25 = 3{,}025$ cm^2.

Answer: 3,025 cm^2

PRACTICE 4 problems

1 A triangle's side grows from 8 cm to 12 cm. Its original perimeter is 30 cm. Find its new perimeter.

ANSWER _____

2 A rectangle has an area of 32 cm^2. It is enlarged by a scale factor of 3/2. Find its new area.

ANSWER _____

3 A solid has a volume of 64 cm^3. A similar solid has a scale factor of 3/4. Find the smaller solid's volume.

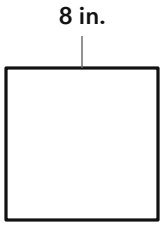
ANSWER _____

4 A model cylinder's surface area grows from 80 cm^2 to 180 cm^2. Find the scale factor.

ANSWER _____

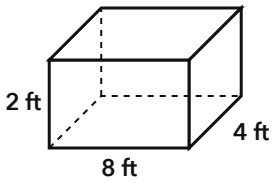
APPLY IT Show your work

1 At a Montana Indigenous arts fair, the square poster shown is enlarged by a scale factor of 3/2. What is the new poster's area?



ANSWER _____

2 A Montana community garden plans a raised bed similar to the one shown. Each length will be 3/2 times as large. How many cubic feet of soil will fill the larger bed?



ANSWER _____

CHALLENGE One step up

Two similar storage bins have a surface-area ratio of 16:1, larger to smaller. The smaller bin holds 18 L. How much does the larger bin hold? Explain using scale factors.

WORK SPACE AND ANSWER

ANSWER KEY

Scale It Up

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A triangle's side grows from 8 cm to 12 cm. Its original perimeter is 30 cm. Find its new perimeter.	**45 cm**
2	A rectangle has an area of 32 cm^2. It is enlarged by a scale factor of 3/2. Find its new area.	**72 cm^2**
3	A solid has a volume of 64 cm^3. A similar solid has a scale factor of 3/4. Find the smaller solid's volume.	**27 cm^3**
4	A model cylinder's surface area grows from 80 cm^2 to 180 cm^2. Find the scale factor.	**3/2**

PART 2 · APPLY IT

1. **144 $in.^2$** The original area is 8 × 8 = 64 $in.^2$. Multiply by $(3/2)^2 = 9/4$ to get 144 $in.^2$.
2. **216 ft^3** The original volume is 8 × 4 × 2 = 64 ft^3. Multiply by $(3/2)^3 = 27/8$ to get 216 ft^3.

CHALLENGE

The length scale factor is 4 because $4^2 = 16$. The volume factor is $4^3 = 64$, so the larger bin holds 18 × 64 = 1,152 L.

Accept equivalent fractions or decimals for scale factors. Volume answers must use cubic units.