LESSON MAKER PRO

Shape the Space

Model real spaces and objects with geometry

HIGH SCHOOL · MT.CORE.GEOM.MEAS.4

MT.CORE.GEOM.MEAS.4 "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..."

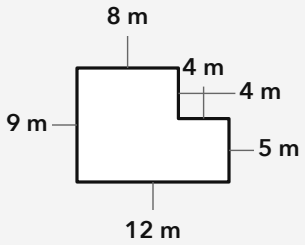
NAME _____ DATE _____

CHOOSE, CALCULATE, CHECK

Match an object to a shape, then use its dimensions to find perimeter, area, surface area, or volume. Subtract any portion that is removed. If every length is multiplied by a scale factor k, area is multiplied by k^2 and volume by k^3.

WORKED EXAMPLE

Find the area of the floor plan shown.

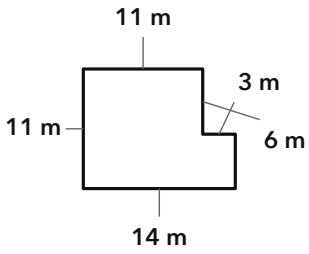


1. Find the area of the full rectangle: 12 × 9 = 108 m^2.
2. Find the area of the missing corner: 4 × 4 = 16 m^2.
3. Subtract: 108 - 16 = 92 m^2.

Answer: 92 m^2

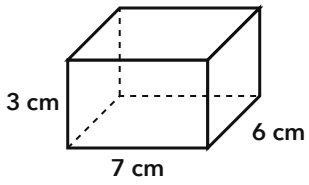
PRACTICE 6 problems

1 Find the area of the outlined space.



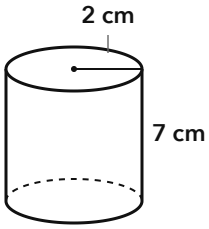
ANSWER _____

2 Find the total surface area of the solid shown.



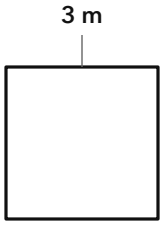
ANSWER _____

3 Find the volume of the solid shown. Give an exact answer.



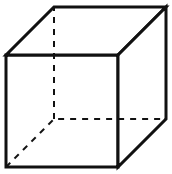
ANSWER _____

4 A larger square has side lengths twice those of the square shown. What is the larger square's area?



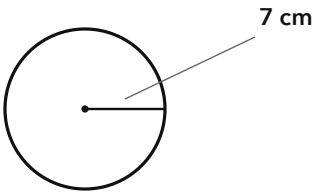
ANSWER _____

5 Every edge of the cube shown is doubled. What is the larger cube's volume?



ANSWER _____

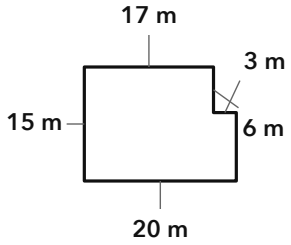
6 Find the circumference of the circle shown. Give an exact answer.



ANSWER _____

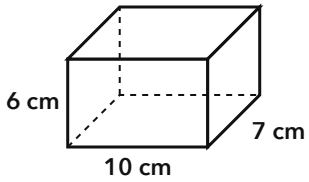
APPLY IT Show your work

1 A Montana school's Indigenous student group organizes an artists' market featuring local Indigenous makers. The outlined space holds booths. How much area is available for booths?



ANSWER _____

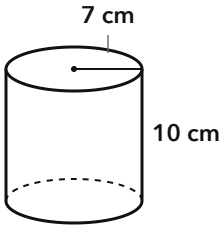
2 A robotics club 3D prints the solid block shown for a project. They remove a rectangular cavity measuring 6 cm by 3 cm by 2 cm. What volume of plastic remains?



ANSWER _____

CHALLENGE One step up

A cylindrical hole with a radius of 2 cm is drilled straight through the full height of the solid shown. What volume remains? Show how you accounted for the hole. Give an exact answer.



WORK SPACE AND ANSWER

Shape the Space

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the area of the outlined space.	**136 m^2**
2	Find the total surface area of the solid shown.	**162 cm^2**
3	Find the volume of the solid shown. Give an exact answer.	**28π cm^3**
4	A larger square has side lengths twice those of the square shown. What is the larger square's area?	**36 m^2**
5	Every edge of the cube shown is doubled. What is the larger cube's volume?	**216 cm^3**
6	Find the circumference of the circle shown. Give an exact answer.	**14π cm**

PART 2 · APPLY IT

1. **282 m^2** Subtract the missing corner from the full rectangle: $20 \times 15 - 3 \times 6 = 282$ m^2.
2. **384 cm^3** Subtract the cavity's volume from the block's volume: $10 \times 7 \times 6 - 6 \times 3 \times 2 = 384$ cm^3.

CHALLENGE

450π cm^3; subtract the hole's volume from the cylinder's volume: $\pi(7^2 - 2^2) \times 10 = 450\pi$.

Accept equivalent exact expressions involving π. For the challenge, look for subtraction of the hole's volume, not its radius, from the original cylinder.