LESSON MAKER PRO

Volume in Action

Find the space inside solids, then put the formulas to work.

HIGH SCHOOL · FA.G.38

FA.G.38 "Fluently use formulas and/or appropriate measuring tools to find length and angle measures, perimeter, area, volume, and surface area of polygons, circles, spheres, cones, cylinders, pyramids, and composite or irregular figures..."

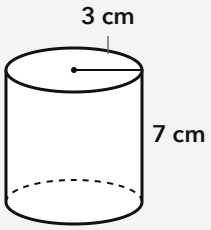
NAME _____ DATE _____

VOLUME FORMULAS

For a cylinder, $V = \pi r^2 h$; for a cone, $V = (1/3)\pi r^2 h$. For a sphere, $V = (4/3)\pi r^3$. Use the radius, not the diameter, and multiply by the filled fraction when a container is only partly full.

WORKED EXAMPLE

Find the volume of the pictured cylinder when it is full and when it is half full.

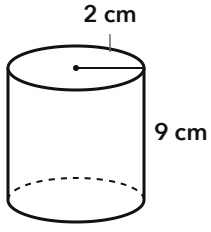


1. Full volume: $V = \pi r^2 h$.
2. $V = \pi(3)^2(7) = 63\pi$ cm^3.
3. Half-full volume: $(1/2)(63\pi) = 63\pi/2$ cm^3.

Answer: Full: 63π cm^3; half full: $63\pi/2$ cm^3.

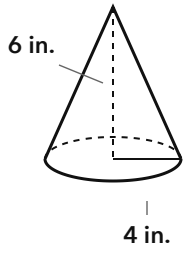
PRACTICE 6 problems

1 Find the volume of the pictured cylinder.



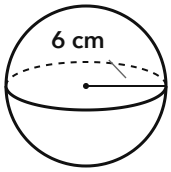
ANSWER _____

2 Find the volume of the pictured cone.



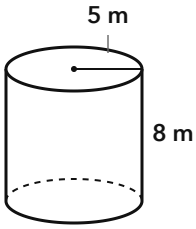
ANSWER _____

3 Find the volume of the pictured sphere.



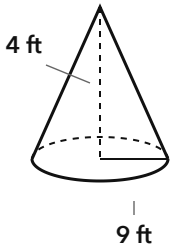
ANSWER _____

4 Find the volume of the pictured cylinder.



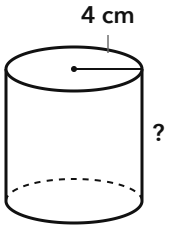
ANSWER _____

5 Find the volume of the pictured cone.



ANSWER _____

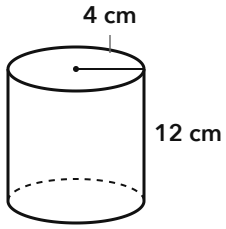
6 The pictured cylinder has a volume of 80π cm^3. Find its height.



ANSWER _____

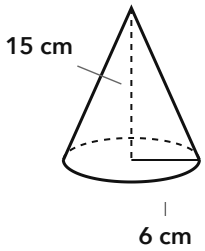
APPLY IT Show your work

1 A music festival sells drinks in cups with the inside dimensions shown. How much drink fits in one full cup? Give an exact volume.



ANSWER _____

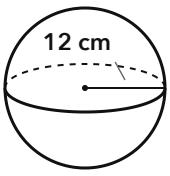
2 A food stall fills a cone-shaped snack holder with popcorn. Its inside dimensions are shown. What is its capacity? Give an exact volume.



ANSWER _____

CHALLENGE One step up

The pictured sphere is melted into smaller spheres, each with a radius of 2 cm. If no material is lost, how many small spheres can be made? Explain using volumes.



WORK SPACE AND ANSWER

Volume in Action

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of the pictured cylinder.	**36π cm^3**
2	Find the volume of the pictured cone.	**32π in.^{3}**
3	Find the volume of the pictured sphere.	**288π cm^3**
4	Find the volume of the pictured cylinder.	**200π m^3**
5	Find the volume of the pictured cone.	**108π ft^3**
6	The pictured cylinder has a volume of 80π cm^3. Find its height.	**5 cm**

PART 2 · APPLY IT

1. **192π cm^3** Use the cylinder formula: $V = \pi(4)^2(12) = 192\pi$ cm^3.
2. **180π cm^3** Use the cone formula: $V = (1/3)\pi(6)^2(15) = 180\pi$ cm^3.

CHALLENGE

216 small spheres. The large sphere has volume 2304π cm^3, and each small sphere has volume $32\pi/3$ cm^3. Dividing gives 216.

Accept equivalent exact expressions involving π. The challenge requires a comparison of the two sphere volumes, not just the count.