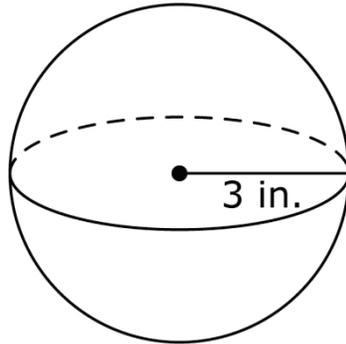


MAT.08.ER.3.0000G.F.011 Claim 3

Sample Item ID:	MAT.08.ER.3.0000G.F.011
Grade:	08
Primary Claim:	Claim 3: Communicating Reasoning Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.
Secondary Claim(s):	Claim 1: Concepts and Procedures Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. Claim 2: Problem Solving Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.
Primary Content Domain:	Geometry
Secondary Content Domain(s):	
Assessment Target(s):	3 F: Base arguments on concrete referents such as objects, drawings, diagrams, and actions. 1 I: Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres. 2 A: Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.
Standard(s):	8.G.9
Mathematical Practice(s):	1, 5, 7
DOK:	3
Item Type:	ER
Score Points:	3
Difficulty:	M
Key:	See Sample Top-Score Response.
Stimulus/Source:	
Target-specific attributes (e.g., accessibility issues):	
Notes:	Part of PT set

Part A

This sphere has a 3-inch radius.

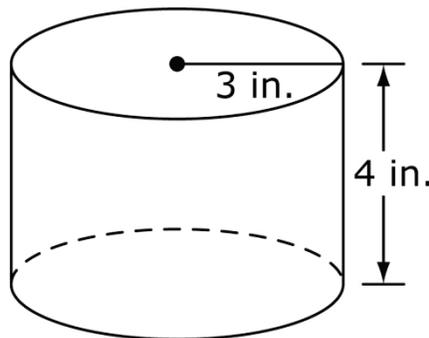


What is the volume, in cubic inches, of the sphere?

Volume = cubic inches

Part B

This right cylinder has a radius of 3 inches and a height of 4 inches.



What is the volume, in cubic inches, of the cylinder?

Volume = cubic inches

[Directions to students on the computer before progressing to Part C]

You will not be allowed to return to Part A or Part B of this task after submitting your answers and clicking Next.

Part C

Lin claims that the volume of any sphere with a radius of r inches is always **equal** to the volume of a cylinder with a radius of r inches and a height of h inches, when $h = \frac{4}{3}r$.

Show all work necessary to justify Lin's claim.

Sample Top-Score Response:

Part A: 36π cu in. (or any number between 113 and 113.1)

Part B: 36π cu in. (or any number between 113 and 113.1)

Part C: I can create the following equation if the volume of the sphere and cylinder are equal,

$$\frac{4}{3}\pi r^3 = \pi r^2 h$$

I can divide both sides of the equation by (πr^2) as shown below.

$$\left(\frac{4}{3}\pi r^3\right) \div (\pi r^2) = (\pi r^2 h) \div (\pi r^2)$$

This justifies Lin's claim.

$$\frac{4}{3}r = h$$

Scoring Rubric:

Responses to this item will receive 0-3 points, based on the following:

3 points: The student shows a thorough understanding of the volume of spheres and cylinders. The student correctly determines the volume of both the sphere (36π) and the cylinder (36π) and provides a clear justification in *Part C*.

2 points: The student shows a partial understanding of the volume of spheres and cylinders. The student either gets both volumes correct but does not provide a clear justification for *Part C* OR the student gets only *Part A* or *Part B* correct AND provides a clear justification in *Part C*.

1 point: The student shows a limited understanding of the volume of spheres and cylinders. The student answers only one part of the task correctly.

0 points: The student shows inconsistent or no understanding of the volume of spheres and cylinders.