

Round Solids: Cylinder, Cone, Sphere Volume

Grade 8 math · Test Answer Key · Standards: 8.G.C.9

Award points as shown in each scoring note. Accept an exact answer with π or a correct decimal with 3.14, and give credit when a correct method contains one arithmetic slip that is carried through consistently.

Standards: 8.G.C.9 · **Level:** Grade 8

Question 1 Cylinder volume (2 points)

$$V = \pi \cdot 7^2 \cdot 9 = \pi \cdot 49 \cdot 9.$$

$$\mathbf{441\pi \text{ ft}^3}$$

Scoring: 1 point for the substitution, 1 point for the answer with units.

Question 2 Cone volume (2 points)

$$V = (1/3)\pi \cdot 9^2 \cdot 10 = (1/3)\pi \cdot 810.$$

$$\mathbf{270\pi \text{ m}^3}$$

Scoring: 1 point for the substitution, 1 point for the answer with units.

Question 3 Sphere volume (3 points)

(a) $15 \div 2 = \mathbf{7.5 \text{ cm}}$

(b) $V = (4/3)\pi \cdot 7.5^3 = (4/3)\pi \cdot 421.875 = \mathbf{562.5\pi \text{ cm}^3}$

(c) $562.5 \cdot 3.14 = \mathbf{1,766.25 \text{ cm}^3}$

Scoring: 1 point per part.

Question 4 Water bottle (3 points)

(a) $V = \pi \cdot 4^2 \cdot 20 = \mathbf{320\pi \text{ cm}^3}$

(b) $320 \cdot 3.14 = \mathbf{1,004.8 \text{ cm}^3}$

(c) $1,004.8 \div 250 = 4.0192$, so **4 full cups**.

Scoring: 1 point per part.

Question 5 Missing height (3 points)

(a) $75\pi = (1/3)\pi \cdot 5^2 \cdot h = (25/3)\pi h$, so $h = 75 \cdot 3 \div 25 = \mathbf{9 \text{ in.}}$

(b) $\pi \cdot 5^2 \cdot 9 = \mathbf{225\pi \text{ in}^3}$, which is 3 times 75π .

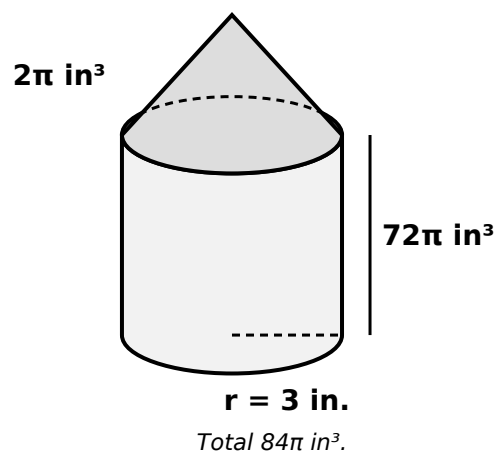
Scoring: part (a) 1 point for the equation, 1 point for the height; part (b) 1 point.

Question 6 Composite solid (3 points)

(a) $\pi \cdot 3^2 \cdot 8 = \mathbf{72\pi \text{ in}^3}$

(b) $(1/3)\pi \cdot 3^2 \cdot 4 = \mathbf{12\pi \text{ in}^3}$

(c) $72\pi + 12\pi = 84\pi$, and $84 \cdot 3.14 = \mathbf{263.76 \text{ in}^3}$



Scoring: 1 point per part.

Question 7 Sphere and cylinder (2 points)

(a) Sphere: $(4/3)\pi \cdot 6^3 = \mathbf{288\pi \text{ in}^3}$. Cylinder: $\pi \cdot 6^2 \cdot 12 = \mathbf{432\pi \text{ in}^3}$.

(b) $288 \div 432 = \mathbf{2/3}$

Scoring: 1 point per part.

Question 8 Gravel pile (2 points)

The radius is 5 ft. $V = (1/3) \cdot 3.14 \cdot 5^2 \cdot 6 = 3.14 \cdot 50$.

157 ft³

Scoring: 1 point for using the radius 5, 1 point for the volume.