

Grade 8 · Volume of Cylinders, Cones and Spheres · Test Answer Key

Common Core 8.G.C.9 · mathovore.fr

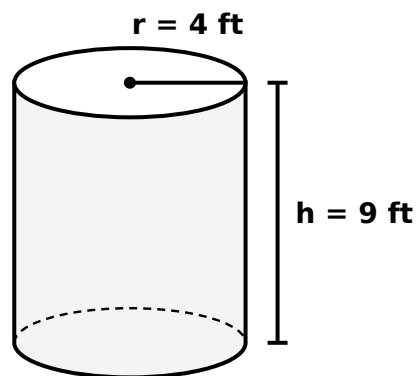
This answer key gives a worked solution and a point-by-point scoring guide for each of the 8 questions. Award partial credit as described, and accept equivalent forms such as $\frac{4}{3}\pi \cdot 729$ written before simplifying. The total is 20 points.

Grade 8 Common Core: 8.G.C.9

Question 1: Volume of a cylinder (2 points)

$$V = \pi r^2 h = \pi(4)^2(9) = 144\pi.$$

$$144\pi \text{ ft}^3$$



$$\begin{aligned} V &= \pi(16)(9) \\ &= 144\pi \text{ ft}^3 \end{aligned}$$

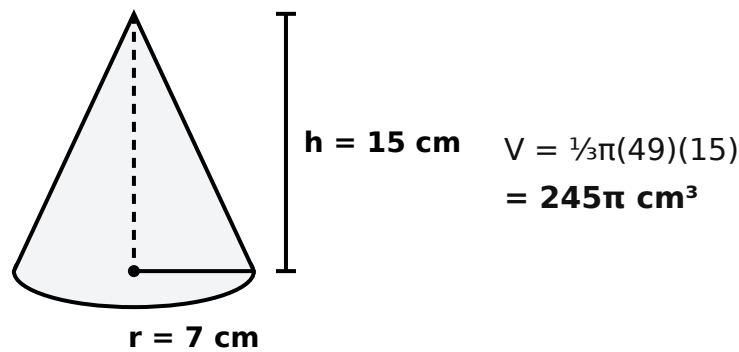
Volume of the cylinder.

Scoring: 1 point for the correct formula and substitution; 1 point for 144π with cubic units.

Question 2: Volume of a cone (2 points)

The radius is $14 \div 2 = 7 \text{ cm}$. $V = \frac{1}{3}\pi(7)^2(15) = \frac{1}{3}\pi \cdot 735 = 245\pi$.

$$245\pi \text{ cm}^3$$

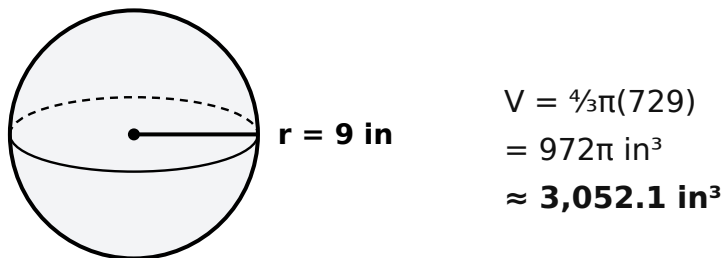


The radius is half the diameter.

Scoring: 1 point for using $r=7$; 1 point for 245π with cubic units.

Question 3: Volume of a sphere (2 points)

- a. $V = \frac{4}{3}\pi(9)^3 = \frac{4}{3}\pi \cdot 729 = 972\pi \text{ in}^3$.
 b. $972 \cdot 3.14 = 3,052.08$, which rounds to $3,052.1 \text{ in}^3$.



Volume of the sphere.

Scoring: 1 point for part (a); 1 point for part (b).

Question 4: Missing height of a cylinder (2 points)

$$1008\pi = \pi(6)^2 h = 36\pi h, \text{ so } h = 1008 \div 36 = 28.$$

$$h = 28 \text{ cm}$$

Scoring: 1 point for the equation $1008\pi = 36\pi h$; 1 point for $h = 28 \text{ cm}$.

Question 5: Missing height of a cone (2 points)

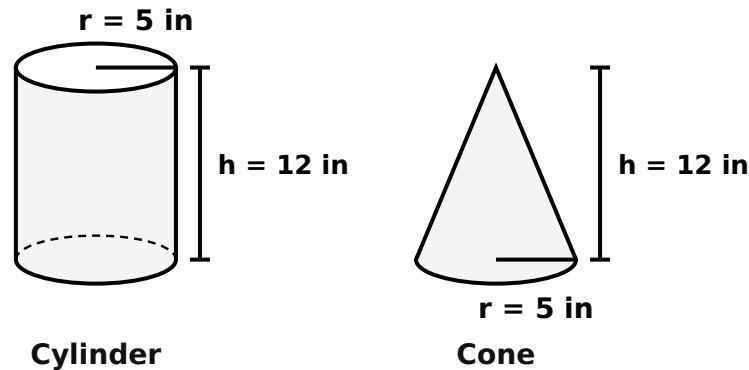
$$1200\pi = \frac{1}{3}\pi(10)^2 h = \frac{100}{3}\pi h. \text{ Multiply both sides by 3: } 3600 = 100h, \text{ so } h = 36.$$

$$h = 36 \text{ m}$$

Scoring: 1 point for a correct equation; 1 point for $h = 36 \text{ m}$.

Question 6: Cone and cylinder together (3 points)

- a. $V = \pi(5)^2(12) = 300\pi \text{ in}^3$.
- b. $V = \frac{1}{3}\pi(5)^2(12) = 100\pi \text{ in}^3$.
- c. $300\pi \div 100\pi = 3$, so **3 cones**.



Cylinder: $300\pi \text{ in}^3$. Cone: $100\pi \text{ in}^3$.

Scoring: 1 point for each part (a), (b), (c).

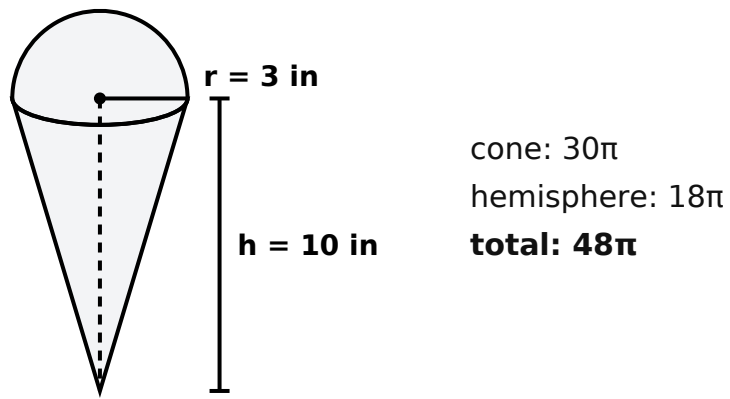
Question 7: Planter and soil (3 points)

- a. $V = \pi(1.5)^2(2) = \pi \cdot 2.25 \cdot 2 = 4.5\pi \approx 4.5 \cdot 3.14 = 14.13$. **About** 14.13 ft^3 .
- b. $14.13 \div 2 = 7.065$. Seven bags are not enough, so she needs **8 bags**.

Scoring: (a) 1 point for the substitution, 1 point for 14.13 with units; (b) 1 point for rounding up to 8.

Question 8: Ice cream cone (4 points)

- a. $\frac{1}{3}\pi(3)^2(10) = 30\pi \text{ in}^3$.
- b. $\frac{1}{2} \cdot \frac{4}{3}\pi(3)^3 = \frac{1}{2} \cdot 36\pi = 18\pi \text{ in}^3$.
- c. $30\pi + 18\pi = 48\pi \text{ in}^3$.
- d. $48 \cdot 3.14 = 150.72$, so about 150.7 in^3 .



The two parts added.

Scoring: 1 point for each part (a), (b), (c), (d).

Total
20 points