

Volume of Cylinders, Cones and Spheres: math test solutions, Grade 8 – download the PDF

Test solutions with the detailed point scale. Add up your points and spot what to review.

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 Computing volumes

/ 4 pts

- a. $V = \pi \times 49 \times 3 = 147\pi \approx 461.58 \text{ cm}^3$. (1 pt)
- b. $V = \frac{1}{3}\pi \times 81 \times 10 = 270\pi \approx 847.8 \text{ mm}^3$. (1.5 pts)
- c. $V = \frac{4}{3}\pi \times 15^3 = \frac{4}{3}\pi \times 3375 = 4500\pi \approx 14,130 \text{ m}^3$. (1.5 pts)

2 True or false?

/ 3 pts

- a. False: the cone has only one third of the cylinder's volume. (1 pt)
- b. False: the radius is squared, so the volume becomes four times larger. (1 pt)
- c. True: volume counts unit cubes, so the units are cubic, such as **cm³**. (1 pt)

3 Unknown dimensions

/ 3 pts

- a. $\pi \times 81 \times h = 486\pi$, so $h = 486 \div 81 = 6$ cm. (1.5 pts)
- b. $\frac{1}{3}\pi r^2 \times 12 = 4\pi r^2 = 64\pi$, so $r^2 = 16$ and $r = 4$ cm. (1.5 pts)

4 Paper cups

/ 3 pts

- a. $V = \frac{1}{3}\pi \times 16 \times 12 = 64\pi \approx 200.96$ cm³. (1.5 pts)
- b. 1 L = 1,000 cm³ and $1000 \div 200.96 \approx 4.98$. Four cups can be filled completely:
 $4 \times 200.96 = 803.84$, and about 196 cm³ is left. (1.5 pts)

5 A spinning top

/ 4 pts

- a. $\pi \times 36 \times 10 = 360\pi$ cm³. (1 pt)
- b. $\frac{1}{3}\pi \times 36 \times 8 = 96\pi$ cm³. (1 pt)
- c. Total: $360\pi + 96\pi = 456\pi$ cm³. (1 pt) $456 \times 3.14 = 1431.84$, so about 1,431.8 cm³. (1 pt)

6 A spherical tank

/ 3 pts

- a. $V = \frac{4}{3}\pi \times 125 = \frac{500}{3}\pi \approx \frac{500 \times 3.14}{3} \approx 523.3$ ft³. (1.5 pts)
- b. $523.33 \times 7.48 \approx 3,914.5$, so about 3,915 gallons. (1.5 pts)



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