

Unit 5: Solid Geometry

ADVANCED · SET 2

Name: _____ Date: _____

Show all work. Give exact answers (leave π and square roots exact; do not round). Write fractions like $\frac{3}{4}$ and ratios like 2:3.

1. A closed right circular cylinder has radius 7 and height 10. Find its total surface area (including both circular ends), in terms of π .

Answer: _____

2. A right circular cone has base radius 9 and height 12. Find its total surface area (lateral surface plus base), in terms of π . (Hint: first find the slant height.)

Answer: _____

3. A sphere has surface area 144π . Find its volume, in terms of π .

Answer: _____

4. Two similar cones have volumes in the ratio 27:64. Find the ratio of their surface areas.

Answer: _____

5. A solid has volume 40. A similar solid is built using a scale factor of $\frac{5}{2}$. Find the volume of the larger solid.

Answer: _____

6. A right circular cone has base radius 12 and height 18. A plane parallel to the base cuts the cone at a point 6 units from the apex (measured along the axis). Find the area of the circular cross-section, in terms of π .

Answer: _____

7. A solid consists of a right circular cylinder of radius 5 and height 14 with a hemisphere of radius 5 sitting on its top. Find the total volume of the solid, in terms of π .

Answer: _____

8. A pyramid has a rectangular base measuring 15 by 8 and a height of 20. Find its volume.

Answer: _____

9. A sphere is inscribed in a cylinder so that the sphere touches the cylinder's side, top, and bottom (the cylinder has radius r and height $2r$). Find the ratio of the sphere's volume to the cylinder's volume.

Answer: _____

10. A frustum of a cone has a larger base radius of 6, a smaller top radius of 3, and a height of 8. Using $V = \frac{1}{3}\pi \times h \times (R^2 + R \times r + r^2)$, find its volume in terms of π .

Answer: _____

11. A cube has edge length 10. A plane passes through one edge of the cube and the opposite parallel edge, slicing the cube into two congruent pieces. Find the area of the rectangular cross-section. Give the exact value.

Answer: _____

12. Two similar solids have surface areas 50 and 450. The smaller solid has volume 20. Find the volume of the larger solid.

Answer: _____