Unit 5: Solid Geometry

ADVANCED

Name: _____ Date: _____

Show all work. Give exact answers; leave pi in your answers where it appears, and write ratios in simplest form.

1. A solid is formed by a cylinder of radius 6 with a cone of the same radius sitting on top. The cylinder has height 10 and the cone has height 8. Find the total volume of the solid (in terms of pi).

Answer: _____

2. A sphere has surface area 12pi. Its radius is then multiplied by 5. Find the surface area of the new sphere (in terms of pi).

Answer: _____

3. Two cones are similar. The ratio of their heights is 3:5. Find the ratio of their volumes (smaller to larger) in simplest form.

Answer: _____

4. A cube has a total surface area of 384 square units. Find its volume.

Answer: _____

5. A cylinder has radius 5 and height 14. A plane passes through its axis, perpendicular to the two circular bases, giving a rectangular cross-section. Find the area of that cross-section.

Answer: _____

6. Find the volume of a sphere with radius 6 (in terms of pi).

Answer: _____

7. A pyramid has a square base with side length 15 and a height of 20. Find its volume.

Answer: _____

8. Two similar solids have surface areas 16 and 81. Find the ratio of their volumes (smaller to larger) in simplest form.

Answer: _____

9. A cone has radius 9 and height 40. Find its lateral (curved) surface area (in terms of pi). Note: the slant height is sqrt(9^2 + 40^2).

Answer: _____

10. A rectangular prism (box) has dimensions 8 × 5 × 12. Find its total surface area.

Answer: _____

11. A cube with side length 10 has a cylindrical hole of radius 3 drilled straight through it, from one face to the opposite face (hole length 10). Find the remaining volume of the solid (in terms of pi).

Answer: _____

12. A pyramid has a base area of 90. A plane parallel to the base cuts the pyramid at the height where the distance from the apex is 2/3 of the pyramid's full height. Find the area of the cross-section.

Answer: _____