1. Cavalieri's Principle leads to the volume formulas for prisms, cylinders, pyramids, cones, and spheres by giving you a way to analyze a solid as a stack of cross-sections.

2. oblique

3. Cavalieri's Principle

4. hemispheres

5. 6

6. pentagon

7. cylinder

8. No; Euler's Law, $F + V = E + 2$, is true for all convex polyhedrons. If $F = V = E$, then $F + F = F + 2$, or $F = 2$. No polyhedron exists with only 2 faces.

9. 49,480.1 mm^3

10. 226.2 yd^3

11. Given the dimensions of the prism in terms of x, y, and z, solve for the volume.

$$V = Bh$$
$$= \left(\tfrac{1}{2}lw\right)h$$
$$= \tfrac{1}{2}\left(\left(\tfrac{1}{2}z\right)(3y)\right)(x)$$
$$= \tfrac{3}{4}xyz$$

12. The volumes are equivalent, $V = 2,646$ cm^3.

13. 112 in.^{3}

14. 5,654.9 m^3

15. $\tfrac{2}{3}t^3$

16. About 25.7 in.^{3}

17. About 7.2 in.^{3}

18. About 1.5 cm^3

19. $16r^3$ cm^3

20. 4 capsules