

12.1/12.3 Surface Area and Volume of Prisms and Cylinders

Definitions:

1. polyhedron-

2. prism-

3. lateral area of prism-

$$L = P \cdot h \quad (P = \text{perimeter of base})$$

4. total surface area of prism-

$$T = L + 2B \quad (B = \text{area of base})$$

5. volume of prism-

$$V = B \cdot h$$

EXAMPLES:

Find the lateral area, total surface area, and volume of each prism.

1. Regular hexagonal prism

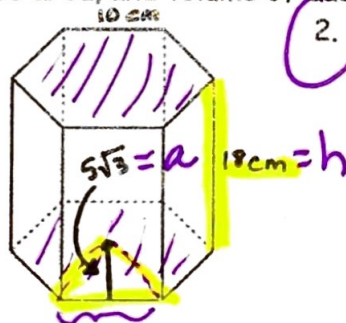
$$B = 6 \left(\frac{1}{2} (10) (5\sqrt{3}) \right) = 150\sqrt{3}$$

$$P = 6(10) = 60$$

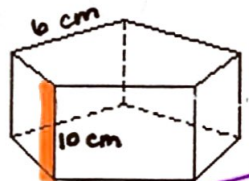
$$L = 60(18) = 1080 \text{ cm}^2$$

$$T = 1080 + 2(150\sqrt{3}) = 1080 + 300\sqrt{3} \text{ cm}^2$$

$$V = (150\sqrt{3})(18) = 2700\sqrt{3} \text{ cm}^3$$



2. Regular pentagonal prism

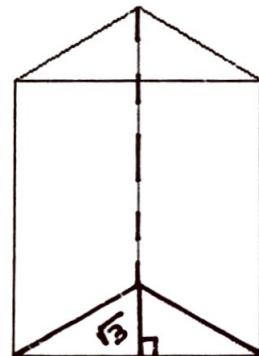


$$L = 300 \text{ cm}^2$$

$$T = 423.87 \text{ cm}^2$$

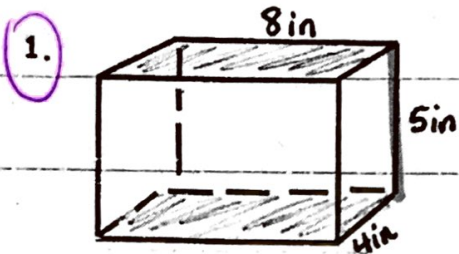
$$V = 619.4 \text{ cm}^3$$

3. Find the volume of a regular triangular prism whose height is 6 cm and whose lateral area is 36 cm.



EXAMPLES:

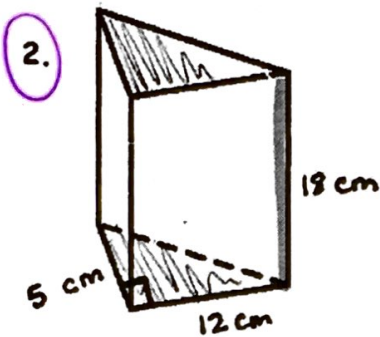
Find the lateral area, total surface area and volume of each prism.



$$L = 120 \text{ in}^2$$

$$T = 184 \text{ in}^2$$

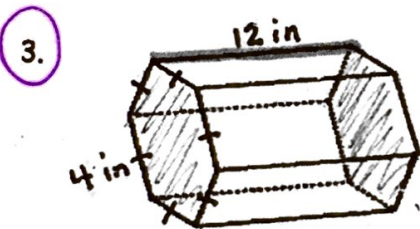
$$V = 160 \text{ in}^3$$



$$L = 540 \text{ cm}^2$$

$$T = 600 \text{ cm}^2$$

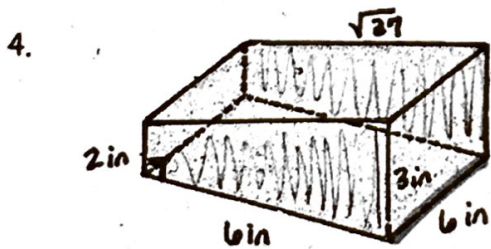
$$V = 540 \text{ cm}^3$$



$$L = 288 \text{ in}^2$$

$$T = 371.1 \text{ in}^2$$

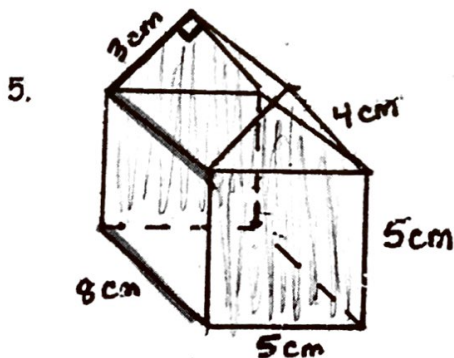
$$V = 498.8 \text{ in}^3$$



$$L = 102.5 \text{ in}^2$$

$$T = 132.5 \text{ in}^2$$

$$V = 90 \text{ in}^3$$



$$L = 176 \text{ cm}^2$$

$$T = 238 \text{ cm}^2$$

$$V = 248 \text{ cm}^3$$