Volume and Surface Area of Composite Figures

Chapter 8 Lesson 8
Find the surface area of each pyramid. Round to the nearest tenth.

1. [Diagram of a pyramid with dimensions 2 cm, 7 cm, 2 cm, 2 cm]

2. [Diagram of a pyramid with dimensions 25 mm, 5 mm, 3 mm, 4 mm]

3. A triangular pyramid has a slant height of 13 inches. The triangular base has a perimeter of 23 inches and an area of 15 square inches. Find the surface area.

4. A square pyramid has a slant height of 6.25 yards. The base has side lengths of 4.8 yards. Find the surface area.

5. **TEST PRACTICE** What is the slant height of a square pyramid with side lengths of 5 centimeters and a surface area of 85 square centimeters?
   - A. 3 centimeters
   - B. 6 centimeters
   - C. 20 centimeters
   - D. 25 centimeters
ANSWERS
1. 32 cm²
2. 156 mm²
3. 164.5 in²
4. 83.0 yd²
5. B
Volume of a Composite Figure

The volume of a composite figure can be found by separating the figure into solids whose volumes you know how to find.

Surface Area of a Composite Figure

You can also find the surface area of composite figures by finding the areas of the faces that make up the composite figure.
1. Find the volume of the composite figure.

1

Find the volume of each prism.

2

\[ V = \ell \cdot w \cdot h \]
\[ V = 8 \cdot 6 \cdot 16 \text{ or } 768 \]

3

The volume is 768 + 384 or 1,152 cubic inches.
Practice Problem:

Find the volume of the figure.
2. Find the volume of the composite figure.

1. Find the volume of the cube and the pyramid. Round to the nearest tenth.

2. 

\[
V = lwh \\
V = 8 \cdot 8 \cdot 8 \text{ or } 512
\]

\[
V = \frac{1}{3} Bh \\
V = \frac{1}{3} (8 \cdot 8)5 \text{ or } 106.7
\]

3. The volume is 512 + 106.7 or 618.7 cubic feet.
Practice Problem

Find the volume of the figure.

- Base: 6 ft x 7 ft = 42 ft²
- Height: 8 ft

Volume of the prism = Base area x Height = 42 ft² x 8 ft = 336 ft³
Answer:

560 ft³
3. Find the surface area of the figure.

1. The surface is made up of three different polygons.

2. The area of each polygon is calculated as follows:

   - Top and bottom faces: 
     \[ A = \ell w + \ell w \]
     \[ A = (8 \cdot 16) + (8 \cdot 8) \]
     \[ A = 128 + 64 \text{ or } 192 \]

   - Front and back faces:
     \[ A = \ell w \]
     \[ A = 6 \cdot 16 \]
     \[ A = 96 \]

   - Side faces:
     \[ A = \ell w \]
     \[ A = 6 \cdot 8 \]
     \[ A = 48 \]

3. The total surface area is \[ 2(192) + 2(96) + 4(48) \text{ or } 768 \text{ square inches.} \]
Find the surface area of the figure.
Answer:

1,084 in$^2$
4. Find the surface area of the figure.

1. The figure is made up of two different polygons.

2. 

   \[ A = lw \]
   \[ A = 8 \times 8 \text{ or } 64 \]

   \[ A = \frac{1}{2}bh \]
   \[ A = \frac{1}{2} \times 8 \times 6.4 \text{ or } 25.6 \]

3. The total surface area is \( 5(64) + 4(25.6) \) or 422.4 square feet.
Practice Problem:

Find the surface area of the figure.
Answer: 373.8 ft²
Explain how you used the solve a simpler problem strategy to solve problems involving volume and surface area of composite figures.