$\qquad$
Module 13 Perimeter, Area, and Volume

Find the volume.
1.


$$
400 \mathrm{in}^{3}
$$

Find the volume.
3.


About 50.24 mm $^{3}$
2.


$$
72 \mathrm{~m}^{3}
$$

4. 



About $769.3 \mathrm{ft}^{3}$
5. The volume of a rectangular pyramid is 73.5 cubic feet. If the height of the pyramid is nine feet, what is the area of the base?

The area of the base is $\mathbf{2 4 . 5}$ feet.
6. A square pyramid has a base with a perimeter of 36 inches and a height of five inches. What is the volume of the pyramid?

The volume of the pyramid is $\mathbf{1 3 5}$ cubic inches.
7. Find the exact volume of the figure.

The volume is $1,800 \pi$ cubic inches.

8. The square pyramid sits inside the cube. The cube and the pyramid have the same height. What is the volume of the cube without the pyramid?

The volume of the cube without the pyramid
 is 144 cubic meters.
9. The volume of the cone is 3,420 cubic yards. Estimate the length of the radius.

The length of the radius is about 11 yards.

10. Pyramid A has a 3 ft by 5 ft rectangular base and a height of eight inches. Pyramid B has a 2 ft by 6 ft rectangular base and a height of 11 inches. Which pyramid has the greater volume? How much greater?

Pyramid B has four more cubic feet than Pyramid A.

## NAME

Module 13 Perimeter, Area, and Volume
Lesson $7 \quad$ Volume: Pyramids and Cones

## Journal

1. How is finding the volume of a pyramid and the volume of a cone the same? How is it different?
2. How is finding the volume of a cone and the volume of a cylinder the same? How is it different?
3. What error was made in finding the volume of the triangular pyramid? Find the correct volume.

$$
\begin{aligned}
V & =\frac{1}{3}(12)(7)(18) \\
& =\frac{1}{3}(84)(18) \\
& =\frac{1}{3}(1512) \\
& =504 \mathrm{ft}^{3}
\end{aligned}
$$



## Cumulative Review

Find the area and perimeter.

1. Find the surface area and volume of the cube.

$$
\begin{align*}
S A & =1,014 \mathrm{ft}^{2} \\
V & =\mathbf{2 , 1 9 7} \mathrm{ft}^{3}
\end{align*}
$$


2. A canister has a diameter of 4 inches and a height of 10.5 inches. Find the volume of the canister.

The volume of the canister is about 131.88 cubic inches.


## Complete the table.

| Rectangular Prisms |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Base | Height | Surface Area | Volume |
| 3. | 10 in . by 12 in . | 7 in . | 548 in. ${ }^{2}$ | $840 \mathrm{in}^{3}{ }^{3}$ |
| 4. | 11 ft by 2 ft | 3.5 ft | $135 \mathrm{ft}^{2}$ | $77 \mathrm{ft}^{3}$ |
| 5. | 10 m by ___ $\mathbf{2}$ m | 14 m | $376 \mathrm{~m}^{2}$ | $280 \mathrm{~m}^{3}$ |

6. A circular window has a circumference of 50.24 inches. What is the radius of the window?

The radius of the window is about eight inches.
7. A regular octagon has a perimeter of 112 centimeters. Find the length of one side of the octagon.

The length of a side of the octagon is 14 cm .

## Possible Journal Answers

1. Finding the volume of a pyramid is the same as finding the volume of a cone because both are found by multiplying the area of the base times the height and then by dividing by three. Finding the volume is different because the base of a pyramid is a polygon and the base of a cone is a circle; the formula for finding the area of a rectangle or triangle is different than for finding the area of a circle.
2. Finding the volume of a cone and the volume of a cylinder is the same because the formulas for both involve multiplying the area of the base by the height of the figure. Finding the volume is different for a cone and a cylinder because the volume of a cylinder is the area of the base times the height and the volume of a cone is one-third the area of the base times the height.
3. The error was in finding the area of the triangular base. It was calculated as base times height rather than one-half the base times the height. The area of the triangular base is $\mathbf{4 2}$ feet rather than 84 feet.

$$
\begin{aligned}
V & =\frac{1}{3} B h \\
& =\frac{1}{3}\left(\frac{1}{2} b h\right)(h) \\
& =\frac{1}{3}\left(\frac{1}{2}(12)(7)\right) 18 \\
& =\frac{1}{3}(42)(18) \\
& =\frac{1}{3}(756) \\
& =252 \mathrm{ft}^{3}
\end{aligned}
$$

