

8.5

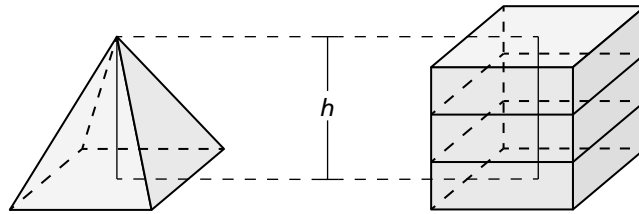
Volumes of Pyramids

For use with Exploration 8.5

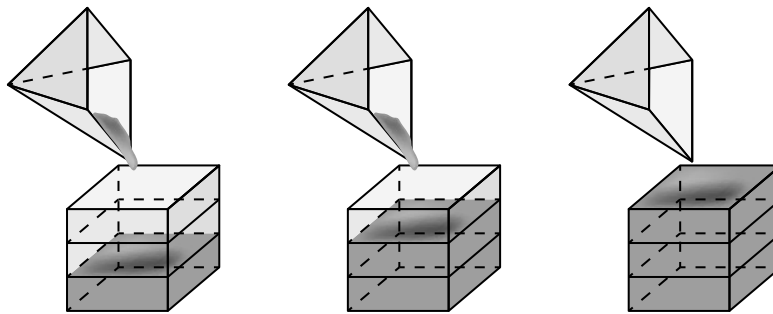
Essential Question How can you find the volume of a pyramid?

1 EXPLORATION: Finding the Volume of a Pyramid

Work with a partner. The pyramid and the prism have the same height and the same square base.



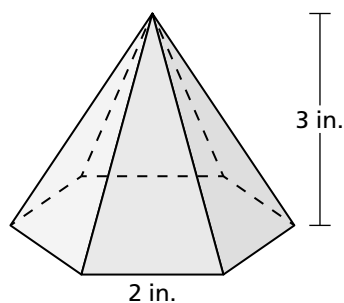
When the pyramid is filled with sand and poured into the prism, it takes three pyramids to fill the prism.



Use this information to write a formula for the volume V of a pyramid.

8.5 Volumes of Pyramids (continued)**2 EXPLORATION:** Finding the Volume of a Pyramid

Work with a partner. Use the formula you wrote in Exploration 1 to find the volume of the hexagonal pyramid.

**Communicate Your Answer**

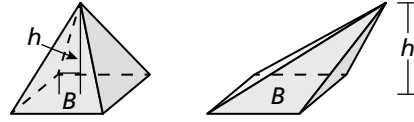
- How can you find the volume of a pyramid?
- In Section 11.5, you will study volumes of cones. How do you think you could use a method similar to the one presented in Exploration 1 to write a formula for the volume of a cone? Explain your reasoning.

8.5**Practice**

For use after Lesson 8.5

Core Concepts**Volume of a Pyramid**The volume V of a pyramid is

$$V = \frac{1}{3}Bh$$

where B is the area of the base and h is the height.**Notes:****Worked-Out Examples****Example #1****Find the indicated measure.**

A pyramid with a square base has a volume of 120 cubic meters and a height of 10 meters. Find the side length of the square base.

$$V = \frac{1}{3}Bh$$

$$120 = \frac{1}{3} \cdot B \cdot 10$$

$$360 = 10B$$

$$36 = B$$

The area of the square base is 36 square meters. So, the side length is $\sqrt{36} = 6$ meters.**Example #2****Find the height of the pyramid.**

$$\text{Volume} = 15 \text{ ft}^3$$

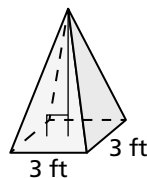
$$V = \frac{1}{3}Bh$$

$$15 = \frac{1}{3} \cdot (3 \cdot 3) \cdot h$$

$$15 = 3h$$

$$5 = h$$

The height of the pyramid is 5 feet.

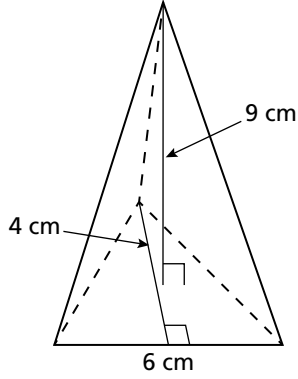


8.5 Practice (continued)

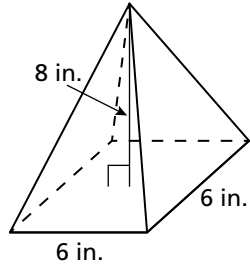
Practice A

In Exercises 1–6, find the volume of the pyramid.

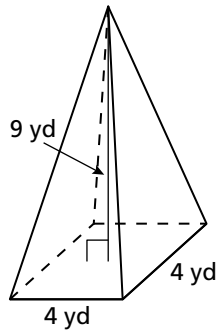
1.



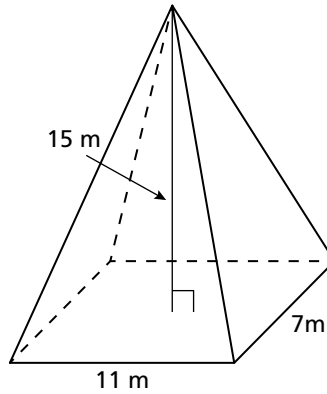
2.



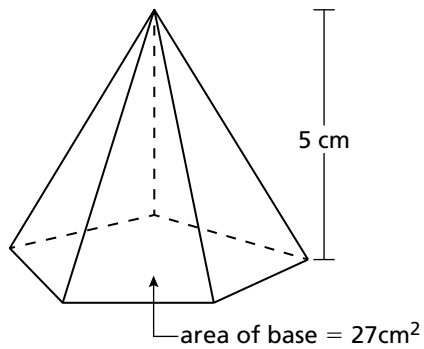
3.



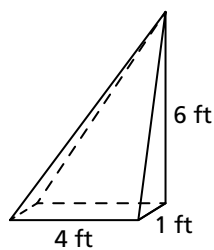
4.



5.



6.



8.5 Practice (continued)

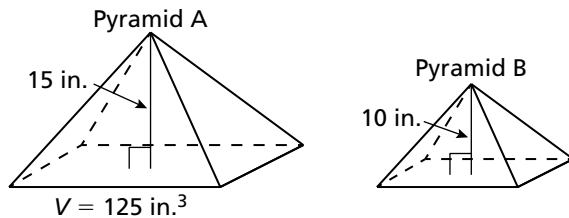
In Exercises 7–9, find the indicated measure.

7. A pyramid with a square base has a volume of 128 cubic inches and a height of 6 inches. Find the side length of the square base.

8. A pyramid with a rectangular base has a volume of 6 cubic feet. The length of the rectangular base is 3 feet and the width of the base is 1.5 feet. Find the height of the pyramid.

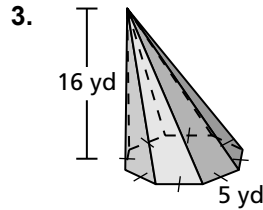
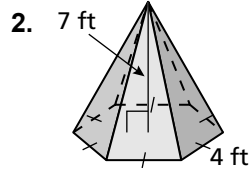
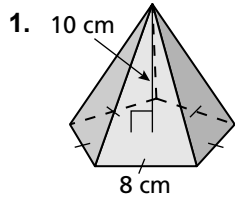
9. A pyramid with a triangular base has a volume of 18 cubic centimeters. The height of the pyramid is 9 centimeters and the height of the triangular base is 3 centimeters. Find the width of the base.

10. The pyramids are similar. Find the volume of pyramid B.



Practice B

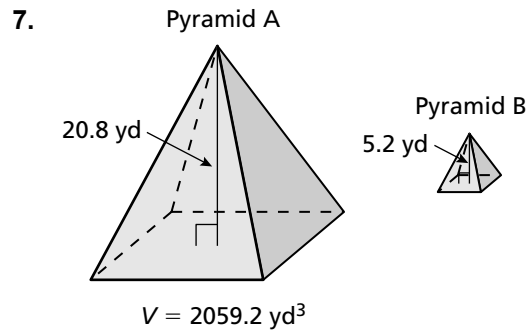
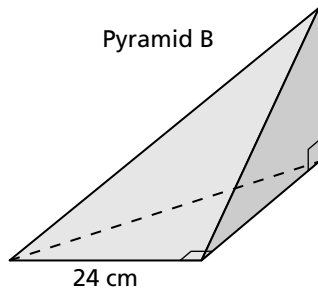
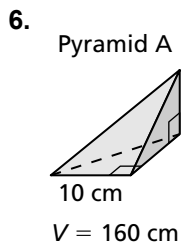
In Exercises 1–3, find the volume of the pyramid.



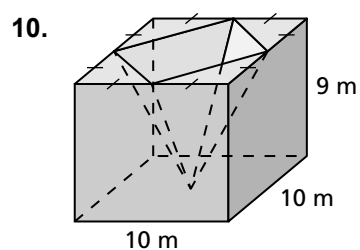
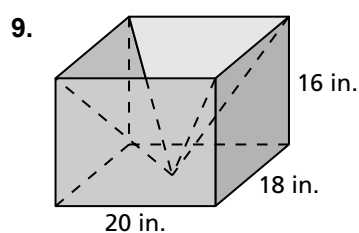
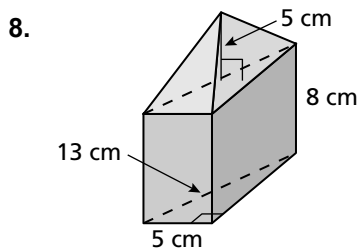
In Exercises 4 and 5, find the indicated measure.

- A pyramid with a square base has a volume of 119.07 cubic meters and a height of 9 meters. Find the side length of the square base.
- A pyramid with a hexagonal base has a volume of about 1082.54 cubic inches and a base area of about 259.81 square inches. Find the height of the pyramid.

In Exercises 6 and 7, the pyramids are similar. Find the volume of Pyramid B.



In Exercises 8–10, find the volume of the composite solid.



11. The volume of the pyramid shown is $48\sqrt{3}$ cubic meters. Find the value of x .

