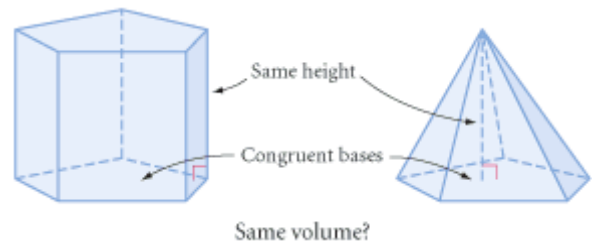


Lesson 10.3: Volume of Pyramids and Cones

In this lesson you will:

- discover the volume formula for pyramids and cones

There is a simple relationship between the volumes of prisms and pyramids with congruent bases and the same height, and between cylinders and cones with congruent bases and the same height.



Investigation 10.3: “The Volume Formula for Pyramids and Cones

In this investigation, we will be comparing the volumes of pyramids and prisms with congruent bases and the same height and the volumes of a cone and a cylinder with congruent bases and the same height.

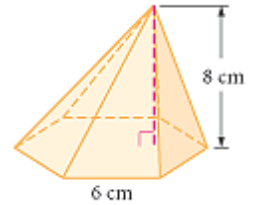
- Fill the square pyramid with popcorn kernels. Pour the contents into the square prism. Repeat until the prism is filled. How many pyramids did it take to fill the prism? ____ So the pyramid has a volume that is ____ the volume of the prism.
- Fill the pentagonal pyramid with popcorn kernels. Pour the contents into the pentagonal prism. Repeat until the prism is filled. How many pyramids did it take to fill the prism? ____ So the pyramid has a volume that is ____ the volume of the prism.
- Fill the cone with popcorn kernels. Pour the contents into the cylinder. Repeat until the cylinder is filled. How many cones did it take to fill the cylinder? ____ So the cone has a volume that is ____ the volume of the cylinder.
- Based on your observations in this investigation, complete the following conjecture.

Pyramid-Cone Volume Conjecture (C-87)

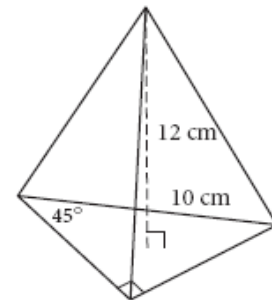
If B is the area of the base of a pyramid or a cone and H is the height of the solid, then the formula for the volume is $V = \frac{1}{3}BH$.

You should have noticed that the volume formula is the same for all pyramids and cones, regardless of the type of base they have. To calculate the volume of a pyramid or cone, first find the area of its base. Then find the product of the fraction you discovered in the investigation, the area of the base, and the height of the solid.

- Example 1: Find the volume of a regular hexagonal pyramid with a height of 8 cm. Each side of its base is 6 cm.



- Example 2: Find the volume of this triangular pyramid.



- Example 3: A cone has a base radius of 3 inches and a volume of 24π in³. Find the height.



⇒ASSIGNMENT: _____