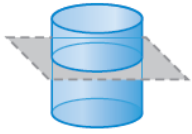


Geometry Lesson 85

Objective: TSW identify and calculate cross sections of solids.



A cross section is the intersection of a three-dimensional figure and a plane. In the diagram, the first plane intersects the cylinder to make a circular cross section. The second plane intersects the cylinder to make a rectangle.



Think of a cross section as the shape that would be revealed if you cut straight through an object.

Example 1 Describing and Sketching Cross

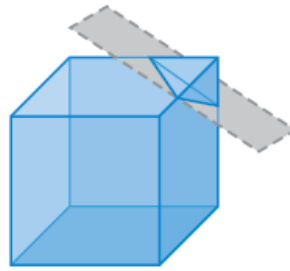
Describe and draw the cross section created by each plane.

a.



SOLUTION

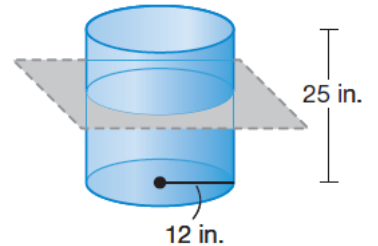
b.



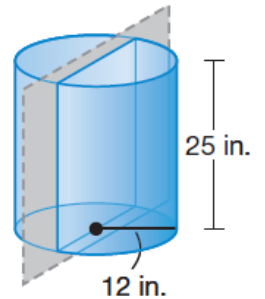
SOLUTION

Example 2 Finding Perimeter of a Cross Section

a. If the plane shown is perpendicular to the altitude of the cylinder, what is the perimeter of the cross section?



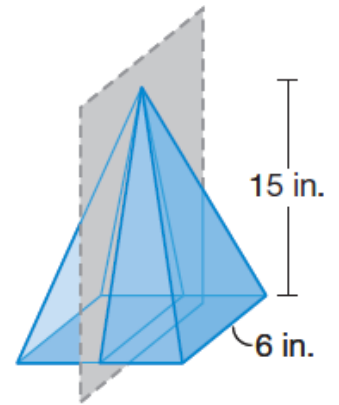
b. If the altitude of the cylinder lies on the plane shown, what is the perimeter of the cross section of the cylinder?



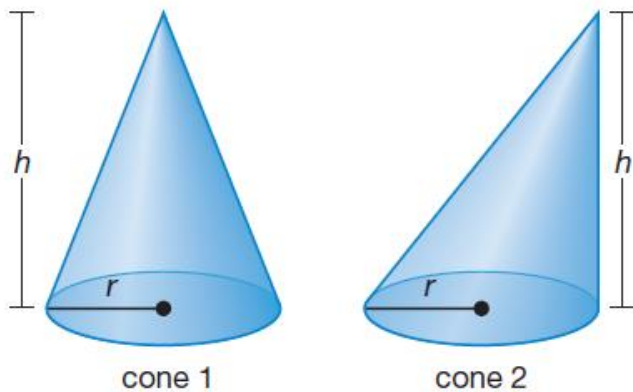
Example 3 Finding Area of a Cross Section

Find the area of this cross section of a square pyramid. The pyramid is 15 inches tall and the base is 6 inches wide. The cross section is perpendicular to the base of the pyramid and passes through the vertex.

SOLUTION



Cavalieri's Principle - If two solids lying between parallel planes have equal heights and all cross sections at equal distances from their bases have equal areas, then the solids have equal volumes.



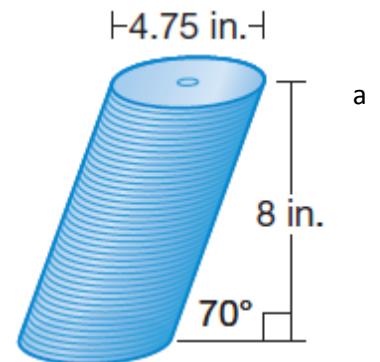
The two cones in the diagram illustrate Cavalieri's principle. The cones have the same radius and height, so Cavalieri's principle indicates that they will also have the same volume.

Imagine cutting the cones into many thin, circular cross sections. Each corresponding circular cross section of the two cones will be congruent.

Example 4 Application: Office Supplies

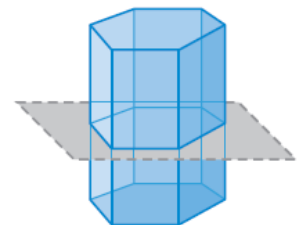
There is a stack of CDs on a desk. The stack is bumped and makes a 70° angle with the table. What is the volume of the stack? Is it equal to the volume of the stack if it made 90° angle with the table?

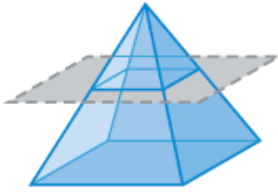
SOLUTION



You Try!!!!

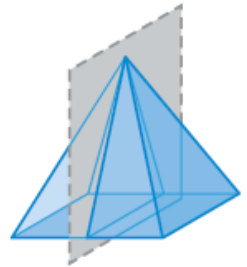
a. If the plane is parallel to the prism's bases, what is the shape of the cross section?



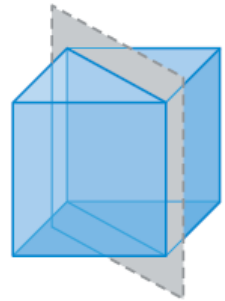


b. Find the perimeter of the cross section of the square pyramid if the cross section is parallel to the base. One side of the cross section is 4 inches long.

c. Find the perimeter of the cross section of the square pyramid. The cross section is perpendicular to the pyramid's base. The height of the pyramid is 14 inches and the base of the pyramid is 12 inches on each side. Round your answer to the nearest hundredth of an inch.



d. Find the area of the cross section. Each edge of the cube is 4 centimeters long. Round your answer to the nearest hundredth square centimeter.



e. Find the exact volume for the oblique cone.

