7-4 Cross Sections

What You'll Learn

To describe cross sections that result from slicing three-dimensional figures

New Vocabulary cross section

CONTENT STANDARDS
7.G.3

Why Learn This?

You can see cross sections when you slice through an apple or cut through a tree trunk.

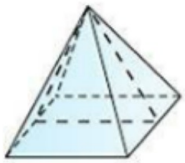
A **cross section** is the two-dimensional shape that you see after slicing through a three-dimensional object.

cross section of an apple

cross section of a tree trunk

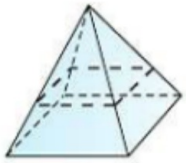
EXAMPLE 1 Identifying a Cross Section

John made a clay model of a square pyramid. He shows the cross section of the pyramid by slicing the pyramid with a string. What is the shape of each cross section?

a. 

Vertical Slice

This slice makes a triangle.

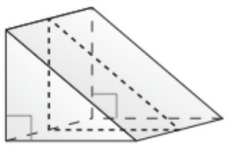
b. 

Horizontal Slice

This slice makes a square.

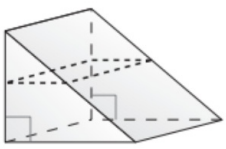
Example

1 Identifying a Cross Section Jordan uses foam blocks in the shape of a triangular prism as props for the school play. He slices one block vertically. He slices another block horizontally. Describe the shape of each cross section.

a. 

Vertical Slice

The vertical slice creates a triangular cross section.

b. 

Horizontal Slice

The horizontal slice creates a rectangular cross section.

Quick Check

1. Jorge and Patti are eating sushi rolls shaped like cylinders. Jorge cut his sushi roll vertically. Patti cut her sushi roll horizontally. What is the shape of each cross section?

a.

Jorge

b.

Patti

You are using reasoning when you describe the cross section formed by the intersection of a solid and a plane. You can also sketch a picture.

Vocabulary Tip

A *plane* is a flat surface that extends indefinitely in all directions and has no thickness.

EXAMPLE 2 Describing a Cross Section

Wood Working Ripping means cutting wood in the same direction as the grain of the wood. Crosscutting means cutting wood across the grain of the wood. Describe the cross section formed by the cuts below.

a.

Ripping the rectangular prism makes a cross section that is a rectangle congruent to the side face of the wood block.

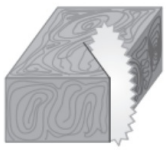
b.

Crosscutting the rectangular prism makes a cross section that is a rectangle congruent to the front face of the wood block.

Example

2 Describing a Cross Section A carpenter is cutting wooden blocks in two ways. He slices some blocks with a vertical cut, from one corner diagonally to the opposite corner. He cuts other blocks horizontally. Draw and describe the cross section formed by the saw cutting the blocks of wood.

a. Vertical Cut



The saw will create a rectangular cross section with length equal to a line diagonally across the block width equal to the block's height.

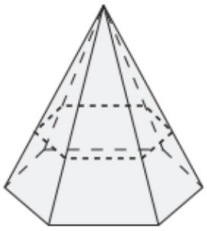
b. Horizontal Cut

The saw will create a rectangular cross section with length equal to the length of the block and width equal to the block's width.

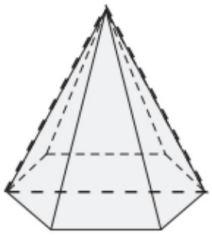
Quick Check

2. Describe the cross section formed by the slices through the hexagonal pyramid.

a.

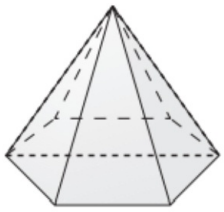


b.



Vocabulary

If you slice through a three-dimensional object like this pyramid, you see a two-dimensional shape called a _____ of the solid.



Name _____ Class _____ Date _____

7-4 • Guided Problem Solving

GPS Student Page 274, Exercise 16:

A three-dimensional figure has a rectangular vertical cross section and a horizontal cross section in the shape of a hexagon.

What is the three-dimensional figure?

vertical cross section 

horizontal cross section 

Understand

1. Circle the information you will need to solve this problem.
2. What are you being asked to do?

_____

_____

Plan and Carry Out

3. Is the three-dimensional figure you will identify going to be a prism or a pyramid?

_____

4. What shape will the face(s) of the figure have?

_____

5. Draw and identify the three-dimensional figure.

_____

Check

6. Draw the two cross sections given in the problem on your figure to check your answer.

Solve Another Problem

7. A three-dimensional figure has a trapezoidal vertical cross section and a horizontal cross section in the shape of a rectangle.

vertical cross section 

horizontal cross section 

What is the three-dimensional figure?

_____