

9.3**Cross Sections of Solids**

For use with Exploration 9.3

Essential Question How can you use a piece of food to create a real-life cross section?

Imagine cutting through a piece of food. The intersection formed by the cut you make and the piece of food is called a **cross section**. The shape of the cross section depends on the angle of the cut you make.

1 EXPLORATION: Describing Cross Sections

Work with a partner. Describe the shapes of the cross sections that are formed by making cuts into each given food so that it is separated into two congruent parts.

a. wheel of cheese



b. watermelon



c. stick of butter



d. cucumber



9.3 Cross Sections of Solids (continued)**2** **EXPLORATION:** Forming Cross Sections

Work with a partner. Describe how you can slice the portion of cheese so that the cross section formed is the given shape.



a. triangle

b. rectangle

c. trapezoid

Communicate Your Answer

3. How can you use a piece of food to create a real-life cross section?
4. Is there more than one way to slice the portion of cheese in Exploration 2 to form a triangular cross section? Explain. Use drawings to support your answer.

9.3

Practice
For use after Lesson 9.3

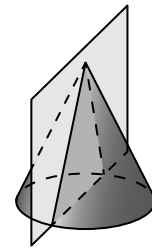
Notes:

Worked-Out Examples

Example #1

Describe the shape formed by the intersection of the plane and the solid.

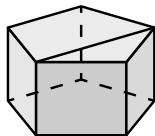
The cross section is a triangle.



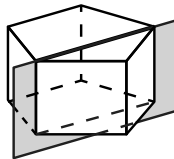
Example #2

Draw the cross section formed by the described plane that intersects the red line segment drawn on the solid. What is the shape of the cross section?

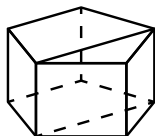
plane is perpendicular to base



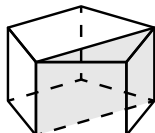
Step 1 Visualize a vertical plane that is perpendicular to the base and passes through the red line segment.



Step 2 The vertical plane is perpendicular to the base of the prism. So, draw the segment parallel to the red segment connecting two vertices on the base of the prism.



Step 3 Shade the cross section.



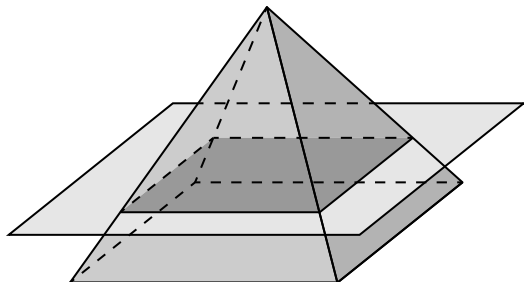
The cross section is a rectangle.

9.3 Practice (continued)

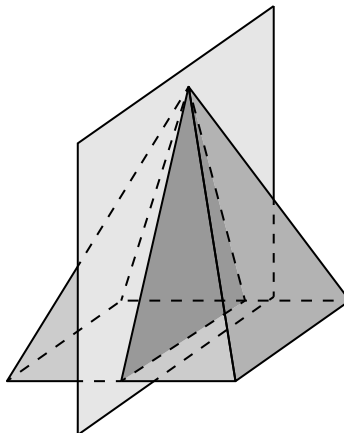
Practice A

In Exercises 1–4, describe the cross section formed by the intersection of the plane and the solid.

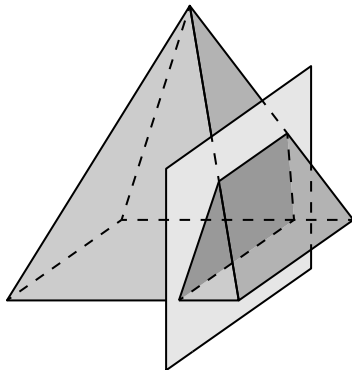
1.



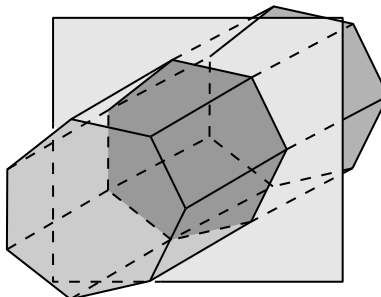
2.



3.



4.

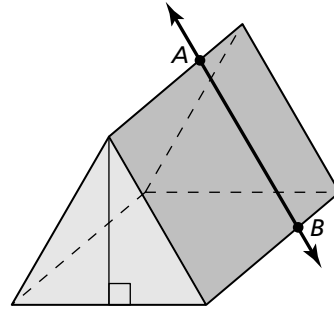
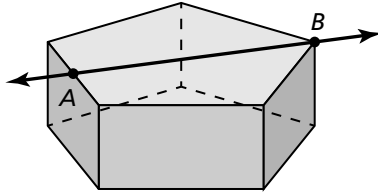


9.3 Practice (continued)

In Exercises 5 and 6, draw the cross section formed by the described plane that contains \overline{AB} . What is the shape of the cross section?

5. plane is perpendicular to base

6. plane is perpendicular to bottom face



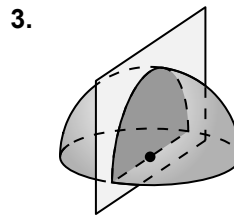
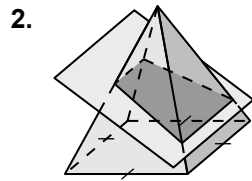
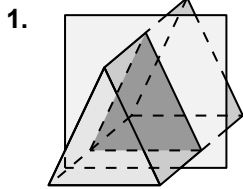
7. You have a pie with a radius of 4.5 inches and a height of 2.25 inches. You cut the pie vertically to make two congruent parts.

a. Find the perimeter and area of the cross section formed by the cut.

b. If you cut one half of the pie again vertically to make two congruent parts, what is the perimeter and area of this new cross section formed?

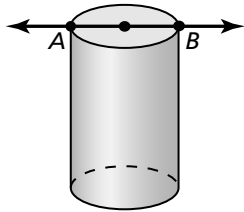
Practice B

In Exercises 1–3, describe the cross section formed by the intersection of the plane and the solid.

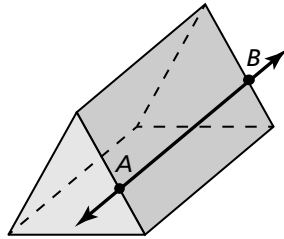


In Exercises 4–6, draw the cross section formed by the described plane that contains \overline{AB} . What is the shape of the cross section?

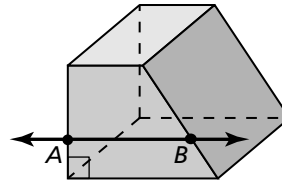
4. plane is perpendicular to base



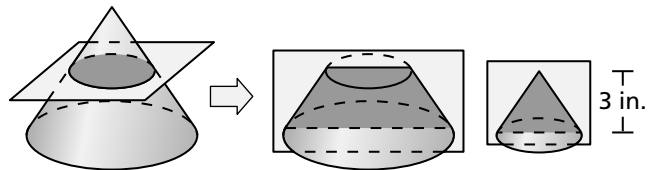
5. plane is parallel to base



6. plane is parallel to base



7. A cone with a height of 6 inches and radius of 4 inches is sliced in half by a horizontal plane, creating a circular cross section with a radius of 2 inches. Each piece is then sliced in half by a vertical plane, as shown.



- Describe the shape formed by each cross section.
- What are the perimeters and areas of the cross sections?
- Suppose the horizontal plane is tilted, slicing the original cone as shown at the right. Is the cross section a circle? If it is not, describe how it is different from a circle and sketch the cross section.

