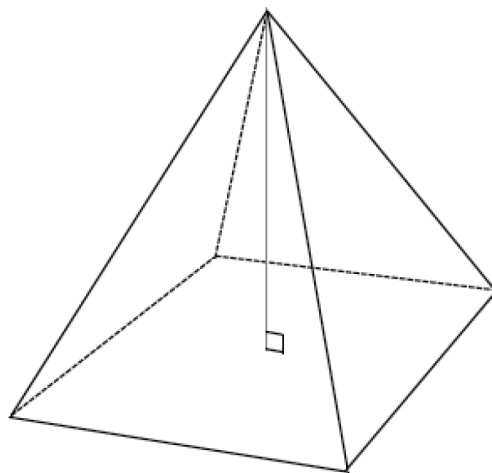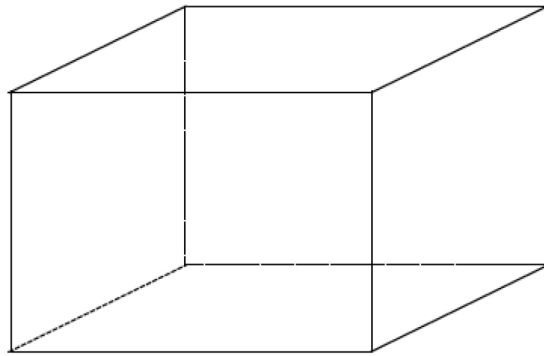# Slicing on an Angle

Draw a slice that has the maximum possible number of sides for each solid. Explain how you got your answer.
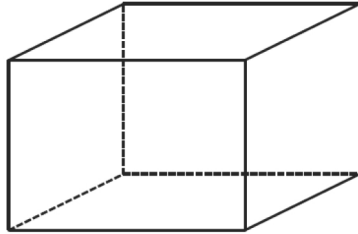
1. Draw a slice into the right rectangular prism at an angle in the form of the provided shape, and draw each slice as a 2D shape.
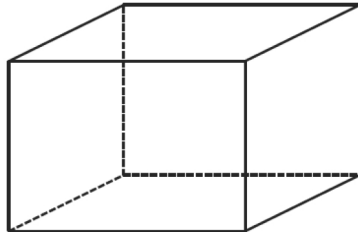
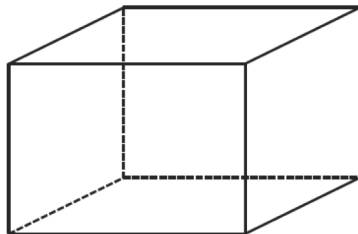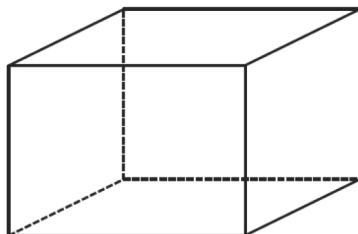Slice made in the prism   Slice as a 2D shape

a. A triangle

b. A quadrilateral
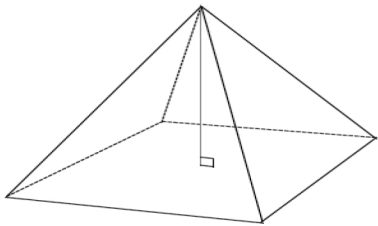
c. A pentagon

d. A hexagon

2. Draw slices at an angle in the form of each given shape into each right rectangular pyramid, and draw each slice as a 2D shape:
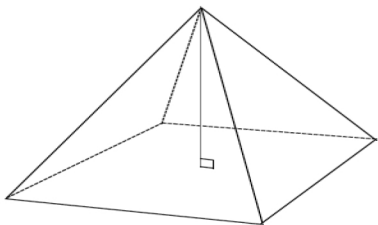
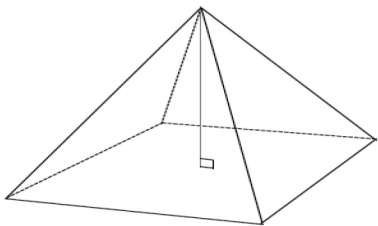Slice made in the pyramid   Slice as a 2D shape

a. A triangle

b. A quadrilateral

c. A pentagon

3. Why isn't it possible to draw a slice in the shape of a hexagon for a right rectangular pyramid?

4. If the slicing plane meets every face of a right rectangular prism, then the slice is a hexagonal region. What can you say about opposite sides of the hexagon?

5. Draw a right rectangular prism so that rectangles ____ and ____ are base faces. The line segments ____, ____, and ____ are edges of the lateral faces.

a. A slicing plane meets the prism so that vertices ___, ___, ___, and ___ lie on one side of the plane and vertices ___, ___, ___, and ___ lie on the other side. What other information can be concluded about the slice based on its position?

b. A slicing plane meets the prism so that vertices ___, ___, ___, and ___ are on one side of the plane and vertices ___, ___, ___, and ___ are on the other side. What other information can be concluded about the slice based on its position?

Draw a slice that has the maximum possible number of sides for each solid. Explain how you got your answer.

The slice in the right rectangular prism should be hexagonal (diagrams will vary); the slice in the right rectangular pyramid should be pentagonal (again, diagrams will vary).

The edges of a slice are determined by the number of faces the slicing plane meets; there cannot be more sides to the polygon than there are faces of the solid.
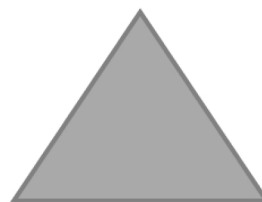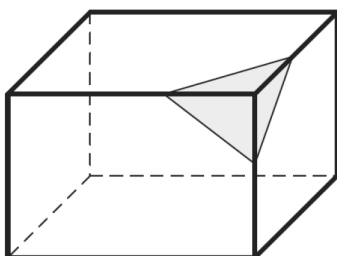
Note that though sample drawings have been provided in Problems 1 and 2, teachers should expect a variety of acceptable drawings from students.

1. Draw a slice into the right rectangular prism at an angle in the form of the provided shape, and draw each slice as a 2D shape.
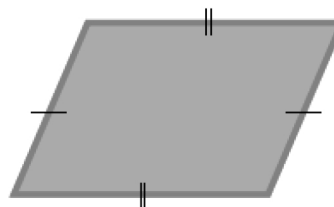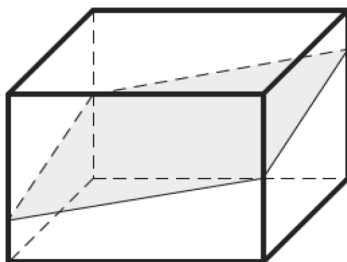
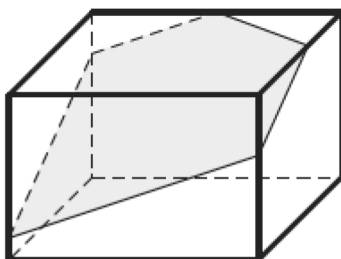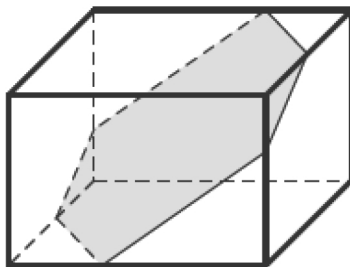Slice made in the prism   Slice as a 2D shape

a. A triangle

b. A quadrilateral

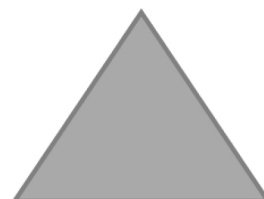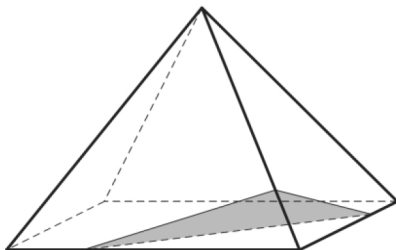c. A pentagon

    d.   A hexagon

2.   Draw slices at an angle in the form of each given shape into each right rectangular pyramid, and draw each slice as a 2D shape:

Slice made in the pyramid	Slice as a 2D shape

a.   A triangle

b.   A quadrilateral

c.   A pentagon

3.   Why isn't it possible to draw a slice in the shape of a hexagon for a right rectangular pyramid?

It is not possible for the shape of a slice to have more sides than the number of faces of the solid.

4.   If the slicing plane meets every face of a right rectangular prism, then the slice is a hexagonal region. What can you say about opposite sides of the hexagon?

The opposite sides of the hexagon lie in opposite faces; therefore, they are parallel.

5. Draw a right rectangular prism so that rectangles   and   are base faces. The line segments   ,   ,
     , and   are edges of the lateral faces.

    a.   A slicing plane meets the prism so that vertices   ,   ,   , and   lie on one side of the plane and vertices
          ,   ,   , and   lie on the other side. What other information can be concluded about the slice based on its
         position?

         *The slice misses the base faces   and   since all the vertices of each face lie on the same side of
         the plane. The slice meets each of the lateral faces in an interval since each lateral face has two vertices on
         each side. The slice is a quadrilateral. In fact, the slice is a parallelogram because opposite faces of a right
         rectangular prism lie in parallel planes.*

    b.   A slicing plane meets the prism so that vertices   ,   ,   , and   are on one side of the plane and vertices
          ,   ,   , and   are on the other side. What other information can be concluded about the slice based on its
         position?

         *The slice meets each face in line segments because in each case three of the vertices of the face are on one
         side of the plane and the remaining vertex lies in the opposite side. The slice is a hexagon because it has six
         edges. Opposite sides of the hexagon are parallel since they lie in parallel planes.*