Lesson Maker Pro

Investigate Plane Sections

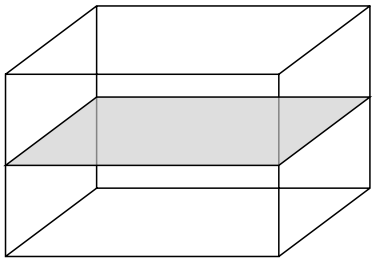
Use explicit interior cuts and draw the resulting two-dimensional figures.

CCSS.Math.Content.7.G.A.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

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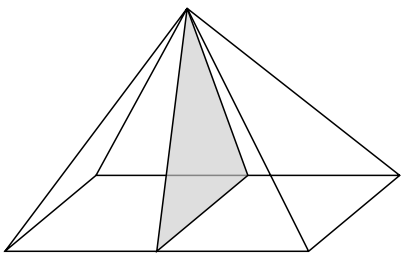
Draw the cut face

Each gray region is the intersection with an interior cutting plane. Draw its actual two-dimensional outline separately; perspective may make rectangles look slanted or circles look oval.



Gray region = cut face
Perspective schematic

1. Cut parallel to the base: draw and name its actual shape.

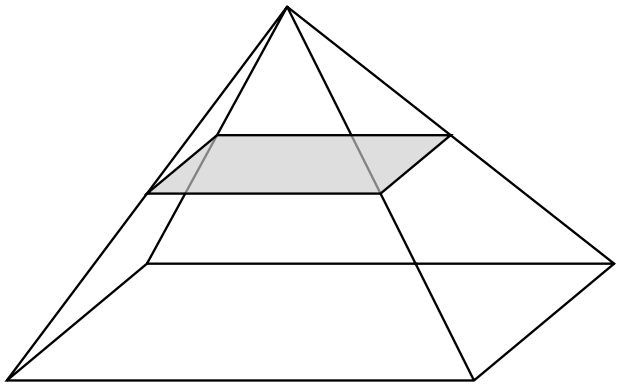


Gray region = cut face
Perspective schematic

2. This cut passes through the apex and the midpoints of opposite base edges, through the solid's interior. Draw and name its shape. Explain why this is more than just touching a side face.

Change the cutting plane

3. A second cut is parallel to the rectangular pyramid's base and strictly between the apex and base. Draw its outline and compare it with the apex cut.



Gray region = cut face

Perspective schematic

4. A right rectangular pyramid has a 24-by 12 cm base and height 18 cm. A parallel cut 6 cm from the apex has what dimensions? A square pyramid has base side 15 cm,height 21 cm; find the side of a parallel section 7 cm from the apex. Explain both scale factors.

5. A cube is cut parallel to a face. A triangular prism is cut parallel to its triangular base. Name and sketch the two sections.

Teacher Key

1:rectangular prism→rectangle;cylinder→circle. The apparent parallelogram/ellipse is a perspective representation, not the actual section shape.2:triangle formed by apex plus the segment joining opposite base-edge midpoints. It crosses the interior, avoiding the original boundary-only base-edge cut.3:rectangle, smaller and similar to the base; a strictly interior parallel cut does not reach the apex.

For the dimension task:6/18=1/3 gives 8-by 4 cm;7/21=1/3 gives square side 5 cm. For the curved-solid task:cone axial cut triangle; cone interior base-parallel cut circle; sphere central section circle; right-cylinder axial cut rectangle. Noncentral interior sphere sections are also circles of smaller radius; tangent planes are excluded.

5:cube face-parallel section square; triangular-prism base-parallel section triangle. Require actual drawn outlines and a reason connecting the cut to the solid; memorized shape names alone are insufficient.