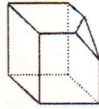


## 5.1 Any Way You Slice It

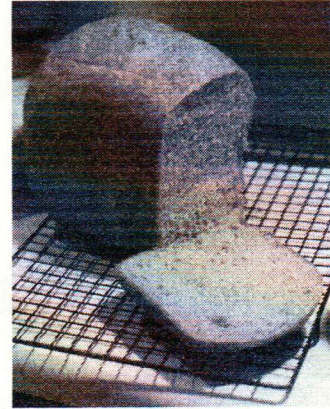
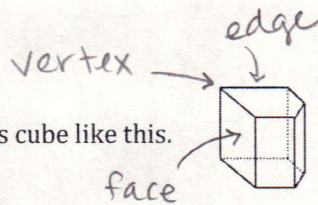
### A Develop Understanding Task

Students in Mrs. Denton's class were given cubes made of clay and asked to slice off a corner of the cube with a piece of dental floss.

Jumal sliced his cube this way.



Jabari sliced his cube like this.



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<https://flic.kr/p/bZrxdy>

1. Which student, Jumal or Jabari, interpreted Mrs. Denton's instructions correctly? *both*

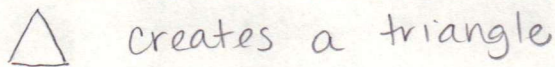
Why do you say so?

*corner is vague and can be interpreted either way.*

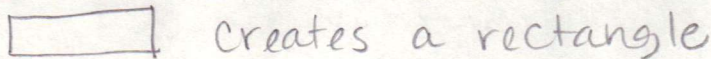
When describing three-dimensional objects such as cubes, prisms or pyramids we use precise language such as *vertex*, *edge* or *face* to refer to the parts of the object in order to avoid the confusion that words like "corner" or "side" might create.

A **cross section** is the face formed when a three-dimensional object is sliced by a plane. It can also be thought of as the intersection of a plane and a solid.

2. Draw and describe the cross section formed when Jumal sliced his cube.



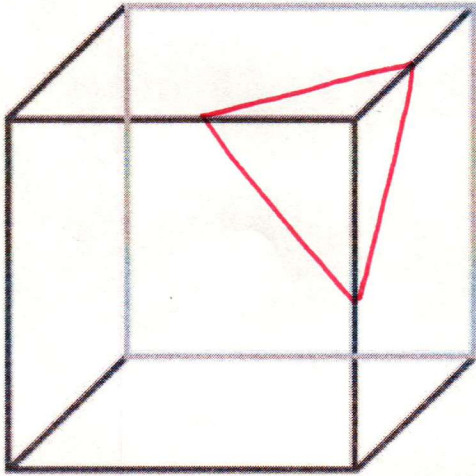
3. Draw and describe the cross section formed when Jabari sliced his cube.



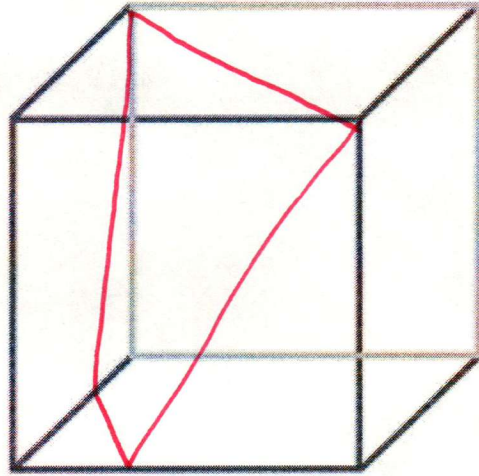
4. Draw some other possible cross-sections that can be formed when a cube is sliced by a plane.

*on next page*

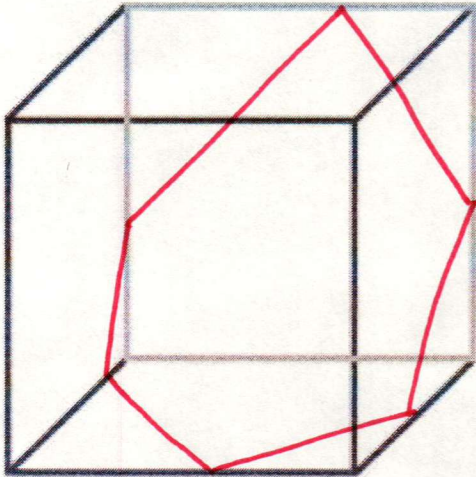




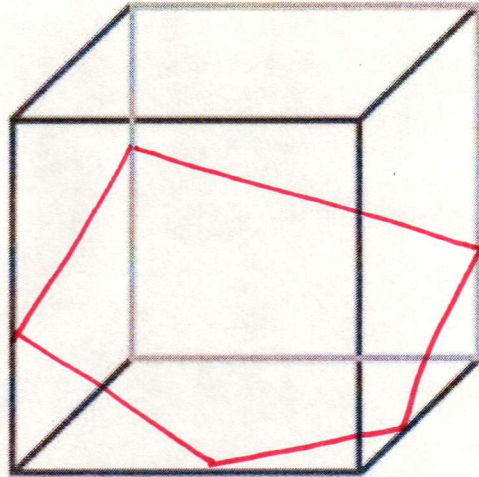
triangle



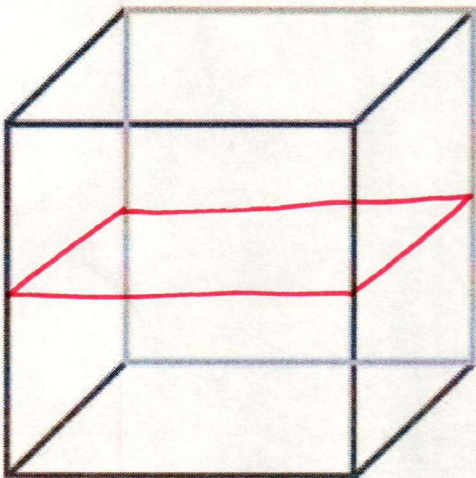
trapezoid



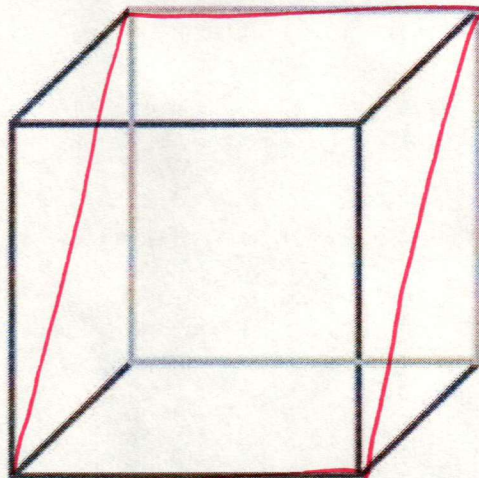
hexagon



pentagon

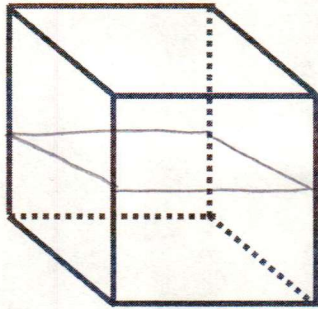


square  
(rhombus)

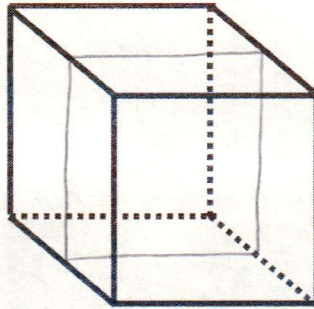


rectangle  
(parallelogram)

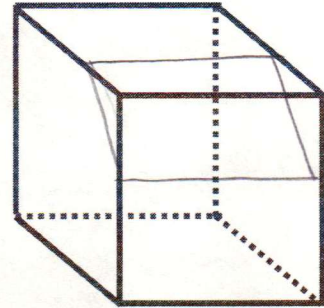




Square



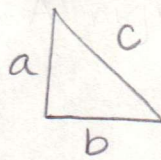
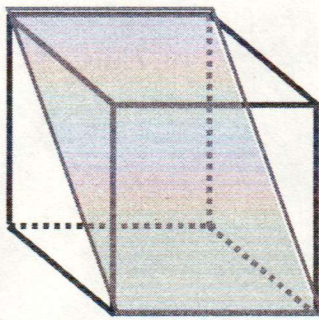
Square



rectangle

5. What type of quadrilateral is formed by the intersection of the plane that passes through diagonally opposite edges of a cube? *rectangle*

Explain how you know what quadrilateral is formed by this cross section.



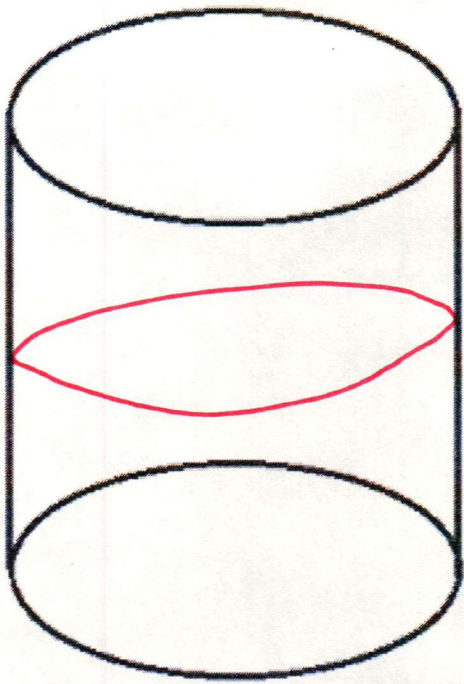
$a = b < c$

One side of the rectangle will equal  $a$  or  $b$  and the other will equal  $c$ .

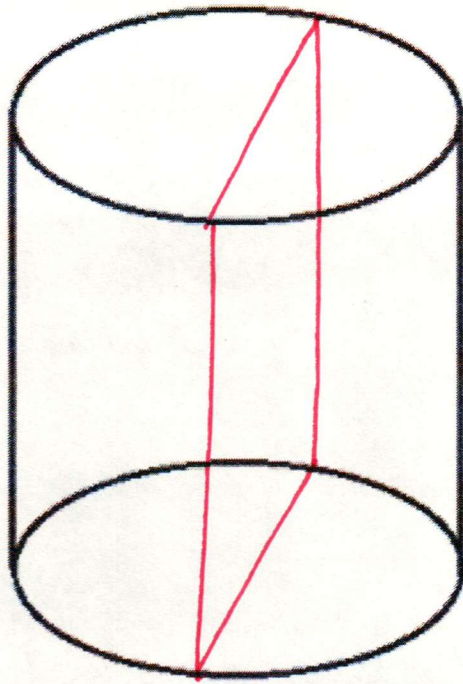
$90^\circ$  angles, opposite sides are parallel & congruent.

Cross sections can be visualized in different ways. One way is to do what Jumal and Jabari did—cut a clay model of the solid with a piece of dental floss. Another way is to partially fill a clear glass or plastic model of the three-dimensional object with colored water and tilt it in various ways to see what shapes the surface of the water can assume.

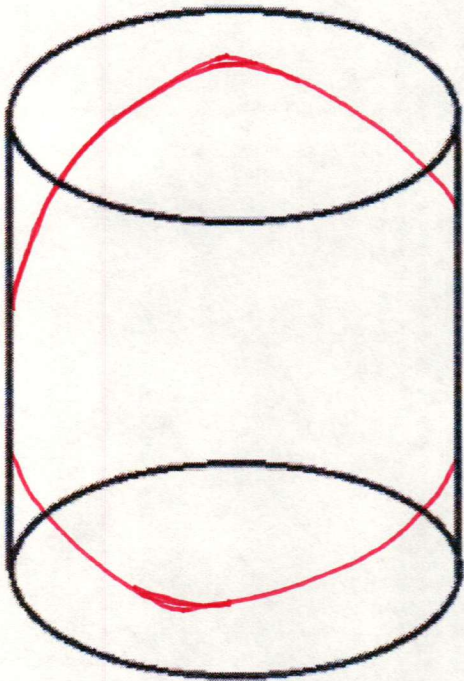




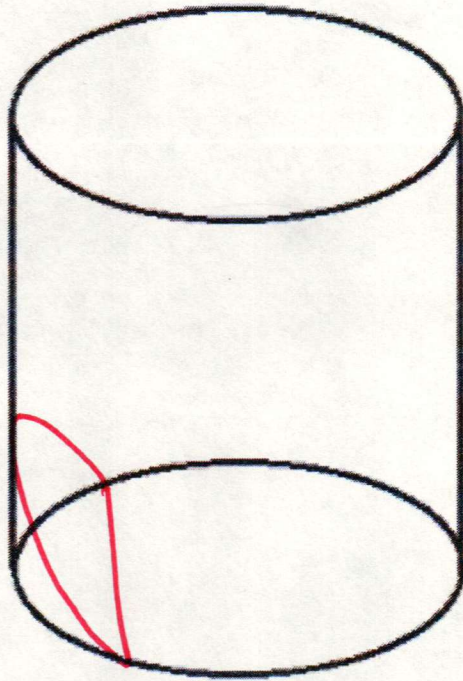
circle



rectangle



ellipse



parabola



Experiment with various ways of examining the cross sections of different three-dimensional shapes.

6. Partially fill a cylindrical jar with colored water, and tilt it in various ways. Draw the cross sections formed by the surface of the water in the jar.

- anything that is parallel to the end will be a circle
- any cross section that results from tipping the cylinder will be an ellipse

7. Try to imagine a cubical jar partially filled with colored water, and tilted in various ways. Which of the following cross sections can be formed by the surface of the water? Which are impossible?

- a square yes
- a rhombus yes
- a rectangle yes
- a parallelogram yes
- a trapezoid yes
- a triangle yes
- a pentagon yes
- a hexagon yes
- an octagon no
- a circle no