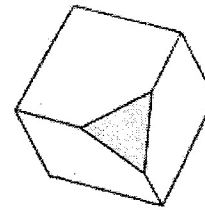
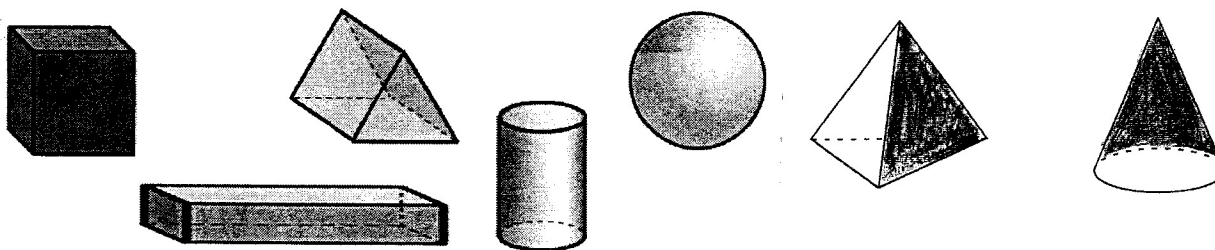


Name _____ Period _____

Cross Sections



A cross section is _____



- 1) Imagine slicing each solid into two pieces using a thin cutting tool (dental floss). You will test each solid to find the cross sections that are created by parallel, perpendicular and diagonal cuts. The cut face on each piece is called the cross section of the solid.
- 2) Predict what two-dimensional figures the cross sections will be before you cut. Enter your guesses in table 1A on the next page for each three-dimensional solid figure. How many different cross sections can you find for each solid?
- 3) Next, using the dental floss (or plastic knife), carefully make each of the cuts you thought about, and describe the actual resulting cross sections in table 1B. How many different cross sections can you find for each solid? Report your data in the table.

Helpful Hints:

1) Cube

Hint 1: Through how many sides of the cube should you slice in order for the cross section to be a triangle?

Hint 2: Are there four-sided cross sections which are not rectangular?

Hint 3: Is it possible to slice through five sides of the cube with a "flat" cut? Six sides?

2) Rectangular Prism

Hint 1: Are there cross-sections of the rectangular prism which are the same type of polygon as cross sections of the cube? Are there any that are polygons?

3 & 4) Spheres and Cylinders

Hint 1: Could a sphere (or a cylinder) have a cross section that is a polygon?

5) Triangular Prism

Hint 1: How could you slice the triangular prism so that you cut through four sides of the prism?

Hint 2: Is there a way to 'tilt' your slice so that it cuts through all five sides of the prism?

6) Triangular Pyramid

Hint 1: Can you slice the triangular pyramid in a way that cuts through all four sides?

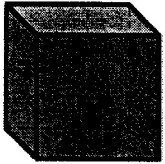

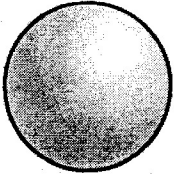
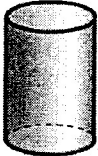
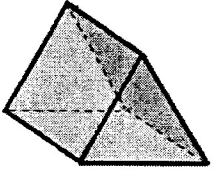
7) Cone

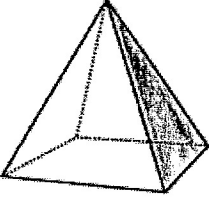
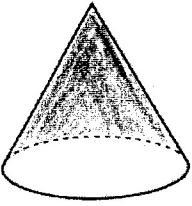
Hint 1: Are there cross sections of the cone which are polygons?

Table 1A: Predictions

Solid	Predictions (pictures or descriptions)
1) Cube	
2) Rectangular Prism	
3) Sphere	
4) Cylinder	
5) Triangular Prism	
6) Triangular Pyramid	
7) Cone	

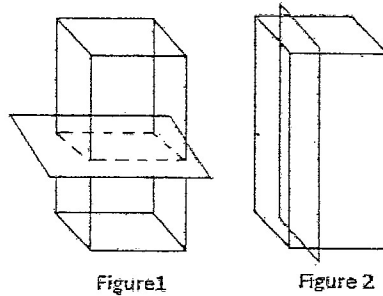
Table 1B: Proven Cross Sections

Solid	parallel cuts	perpendicular cuts	diagonal cuts
<p>1. Cube</p> 			
<p>2. Rectangular Prism</p> 			
<p>3. Sphere</p> 			
<p>4. Cylinder</p> 			
<p>5. Triangular Prism</p> 			

Solid	parallel cuts	perpendicular cuts	diagonal cuts
6. 			
7. 			

Lets look at the cross sections of right prisms and right pyramids.

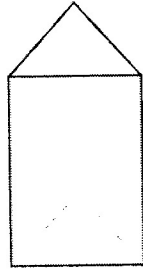
Rectangular prisms



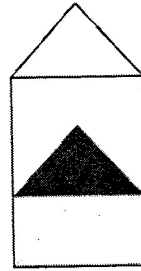
1) In the cross section parallel to the bases, _____

2) In the cross section perpendicular to the bases, _____

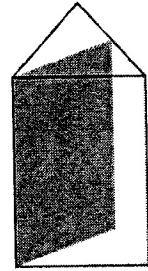
Right prisms



Initial Diagram



Cross Section Parallel
to the Bases



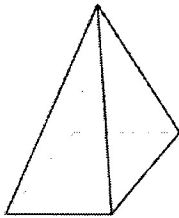
Cross Section Perpendicular
to the Bases

We can make the following observations that can be generalized to other right prisms:

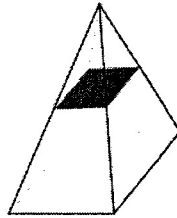
1) In the cross section parallel to the bases, _____
_____.

2) In the cross section perpendicular to the bases, _____
_____.

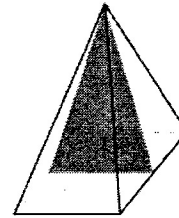
Right Pyramids



Initial Diagram



Cross Section Parallel
to the Base

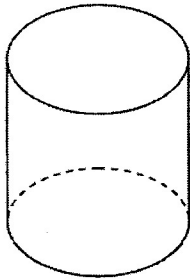


Cross Section Perpendicular
to the Base

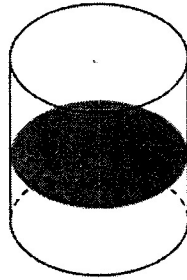
1) In the cross section parallel to the bases, _____
_____.

2) In the cross section perpendicular to the bases, _____
_____.

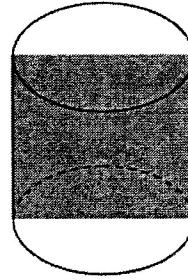
Right Cylinders



Initial Diagram



Cross Section Parallel
to the Bases

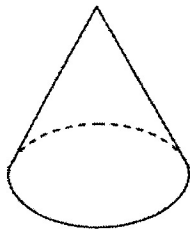


Cross Section Perpendicular
to the Bases

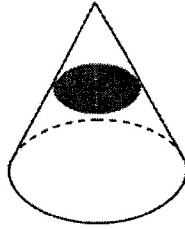
1) In the cross section parallel to the bases, _____

2) In the cross section perpendicular to the bases, _____

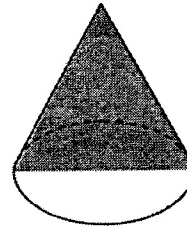
Right Cones



Initial Diagram



Cross Section Parallel
to the Base



Cross Section Perpendicular
to the Base

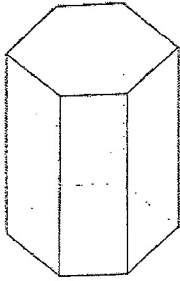
1) In the cross section parallel to the base, _____

2) In the cross section perpendicular to the base, _____

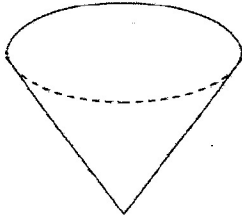
More Practice with cross sections:

For each of the solids below, sketch two cross sections as described in the examples above. One cross section should be parallel to a base, and the other perpendicular to a base. Then identify each of the cross sections with a name (regular pentagon, triangle, rectangle, circle, etc.)

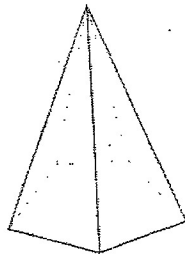
1.



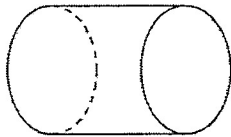
2.



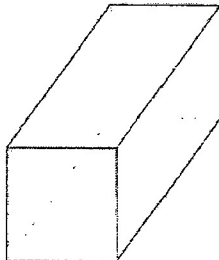
3.



4.



5.



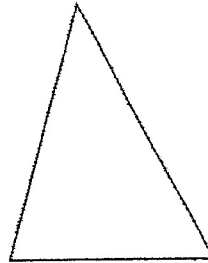
Exercises

For each of the exercises below, sketch a solid which could have the given cross sections.
(Some answers may not be unique.)

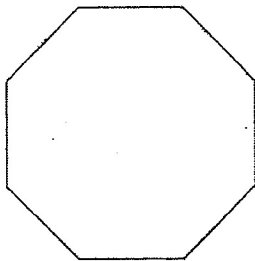
1. Cross section parallel to a base:



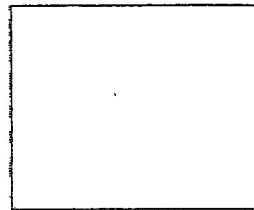
Cross section perpendicular to a base:



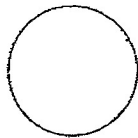
2. Cross section parallel to a base:



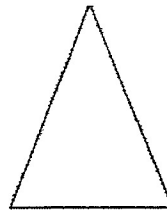
Cross section perpendicular to a base:



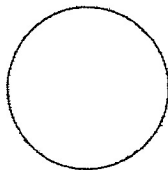
3. Cross section parallel to a base:



Cross section perpendicular to a base:



4. Cross section parallel to a base:



Cross section perpendicular to a base:

