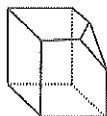


5.1 Any Way You Slice It

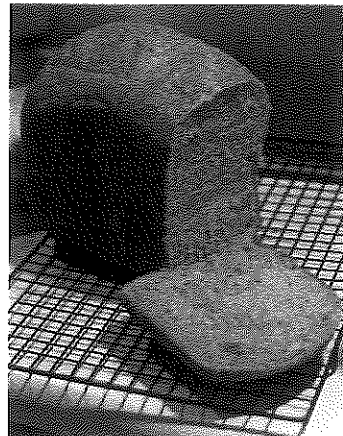
A Develop Understanding Task

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.



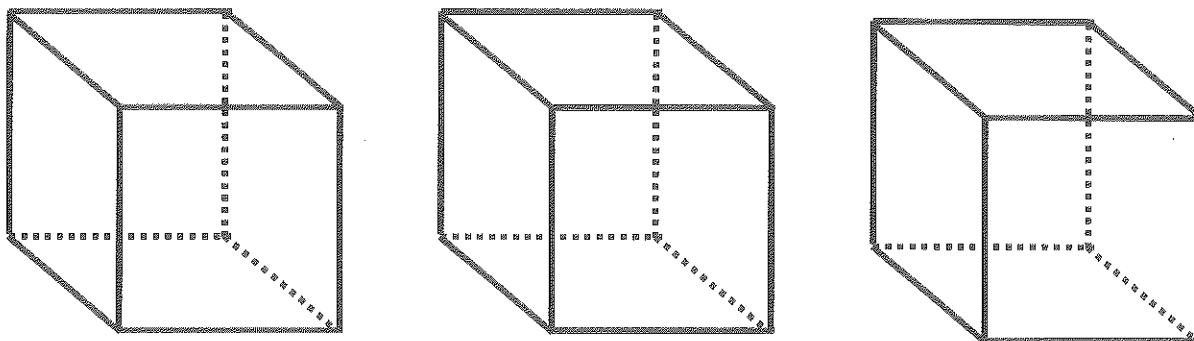
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<https://flic.kr/p/bZrxdy>

1. Which student, Jumal or Jabari, interpreted Mrs. Denton’s instructions correctly?
Why do you say so?

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.

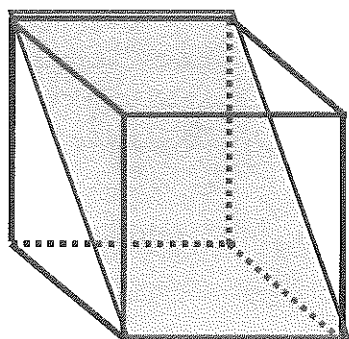
A **cross section** is the face formed when a three-dimensional object is sliced by a plane. It can also be thought of as the intersection of a plane and a solid.

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.



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

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



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.

READY, SET, GO!

Name _____

Period _____

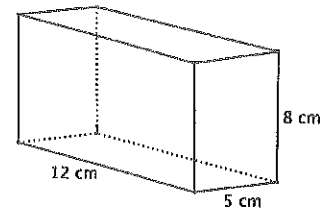
Date _____

READY

Topic: Comparing perimeter, area and volume

Solve each of the following problems. Make certain you label the units on each of your answers.

1. Calculate the perimeter of a rectangle that measures 5 cm by 12 cm.
2. Calculate the area of the same rectangle.
3. Calculate the volume of a rectangular box that measures 5 cm by 12 cm, and is 8 cm. deep.



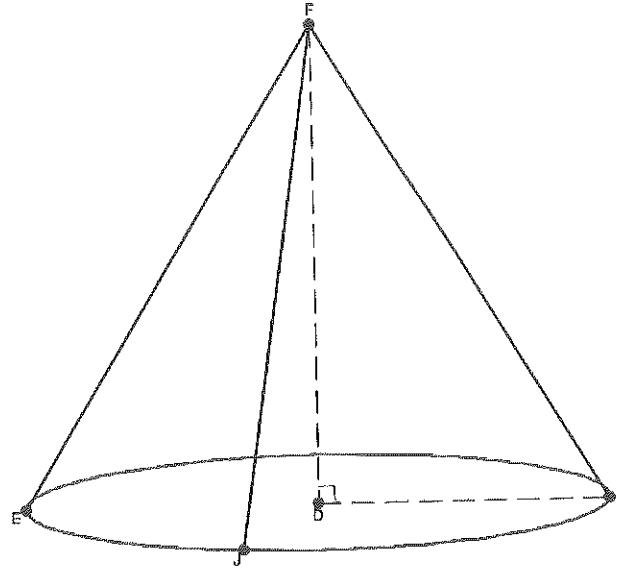
4. Look back at problems 1 – 3. Explain how the units change for each answer.
5. Calculate the surface area for the box in problem 3. Assume it does NOT have a cover on top. Identify the units for the surface area. How do you know your units are correct?
6. Calculate the circumference of a circle if the radius measures 8 inches. (Use $\pi = 3.14$)
7. Calculate the area of the circle in problem 6.
8. Calculate the volume of a ball with a diameter of 16 inches. ($V = \frac{4}{3}\pi r^3$)
9. Calculate the surface area of the ball in problem 8. ($SA = 4\pi r^2$)
10. If a measurement were given, could you know if it represented a perimeter, an area, or a volume? Explain.
11. In the problems above, which type of measurement would be considered a “linear measurement?”

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SET

Topic: Examining the cross sections of a cone

Consider the intersection of a plane and a cone.



12. If the plane were parallel to the base of the cone, what would be the shape of the cross-section? Can think of 2 possibilities? Explain.

13. How would a plane need to intersect the cone so that it would create a parabola?

14. Describe how the plane would need to intersect the cone in order to get a cross-section that is a triangle. Would the triangle be scalene, isosceles, or equilateral? Explain.

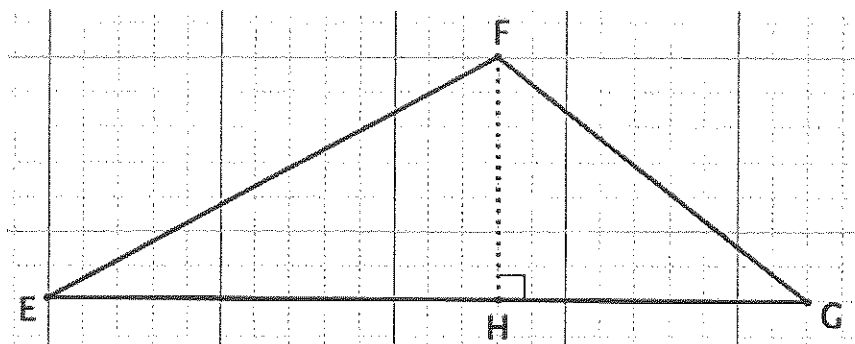
15. Would it be possible for the intersection of a plane and a cone to be a line? Explain.

GO

Topic: Finding the area of a triangle

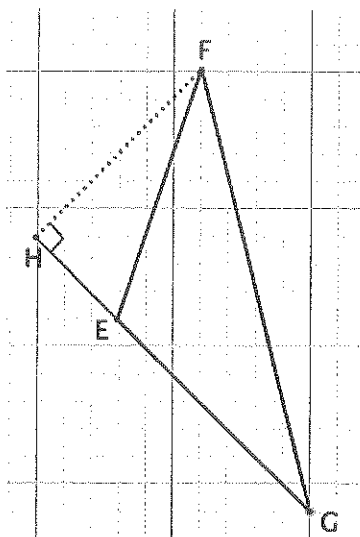
Calculate the area of triangle EFG in each exercise below.

16.

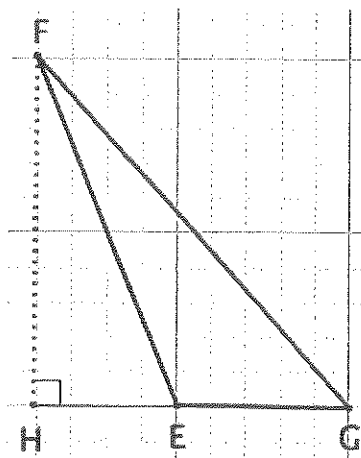


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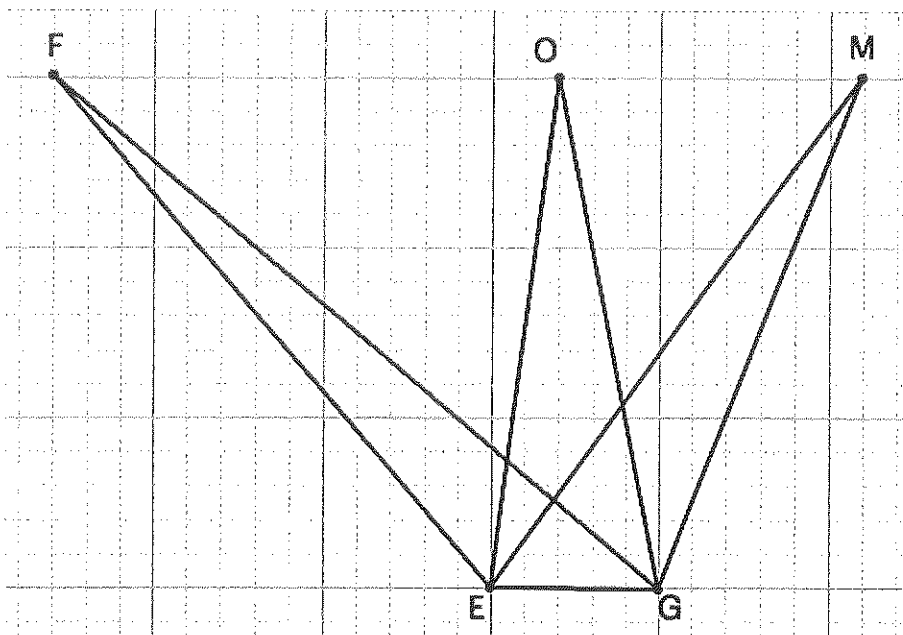
17.



18.



19. Calculate the areas of $\triangle EFG$, $\triangle EOG$, and $\triangle EMG$. Justify your answers.



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