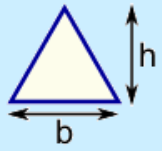
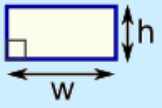
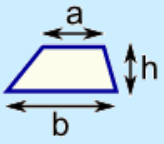
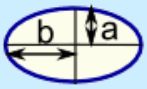
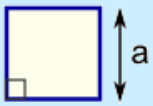
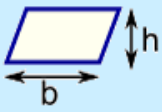
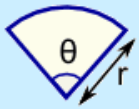
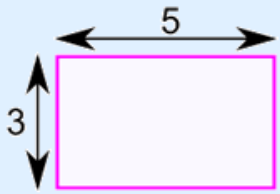
5.1 notes

grab note paper and new chapter

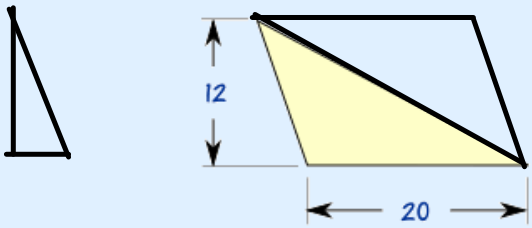
	Triangle Area = ½ × b × h b = base h = vertical height
	Rectangle Area = w × h w = width h = height
	Trapezoid (US) Trapezium (UK) Area = ½(a+b) × h h = vertical height
	Ellipse Area = πab

	Square Area = a^2 a = length of side
	Parallelogram Area = b × h b = base h = vertical height
	Circle Area = π × r^2 Circumference = 2 × π × r r = radius
	Sector Area = ½ × r^2 × θ r = radius θ = angle in **radians**

Example: What is the area of this rectangle?

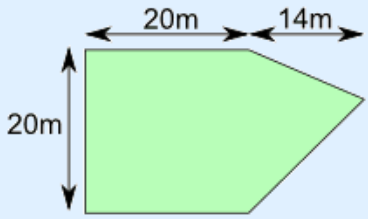


What is the area of this triangle?

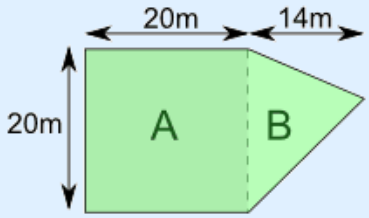


Example: Sam cuts grass at $0.10 per square meter

How much does Sam earn cutting this area:

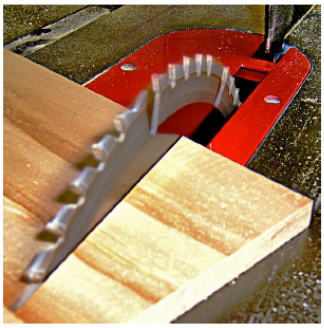


Let's break the area into two parts:



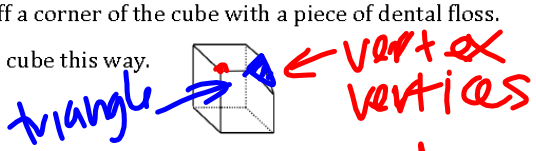
5.1 Any Way You Slice It

A Develop Understanding Task

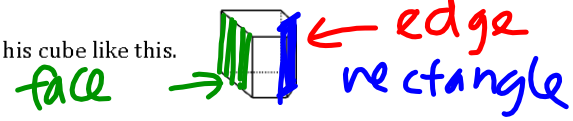


Students in Mrs. Denton's class were given cubes made of clay and asked to slice off a corner of the cube with a piece of dental floss.

Jumal sliced his cube this way.



Jabari sliced his cube like this.



1. Which student, Jumal or Jabari, interpreted Mrs. Denton's instructions correctly?
   Why do you say so? Neither. corner is inaccurate

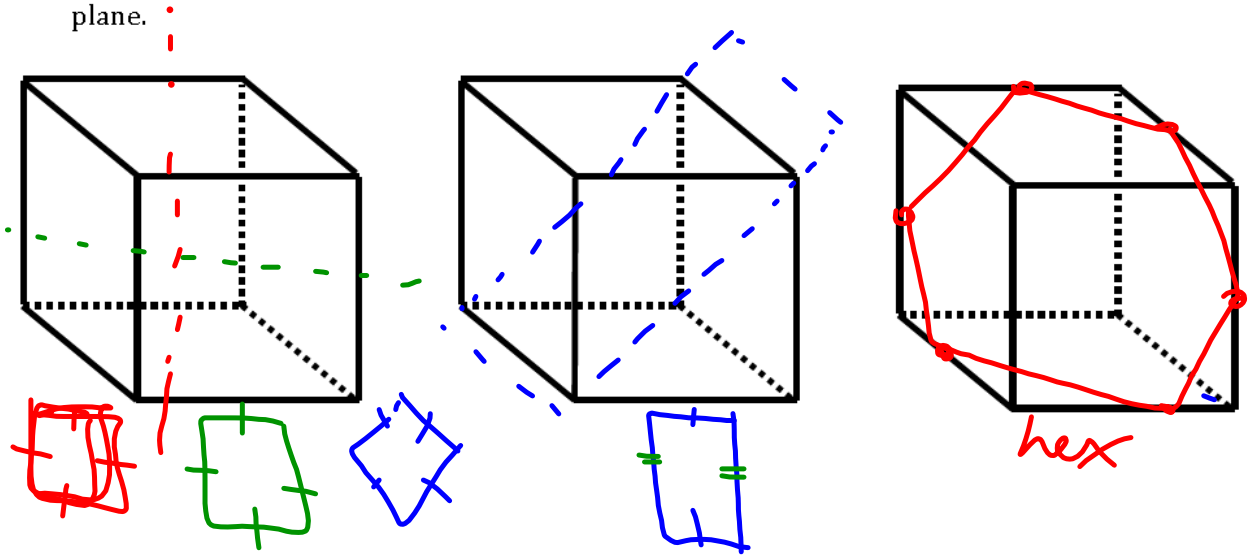
When describing three-dimensional objects such as cubes, prisms or pyramids we use precise language such as *vertex*, *edge* or *face* to refer to the parts of the object in order to avoid the confusion that words like "corner" or "side" might create.

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.

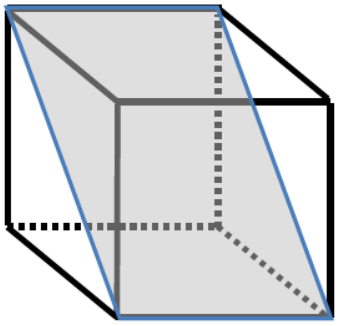
3. Draw and describe the cross section formed when Jabari sliced his cube.

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?

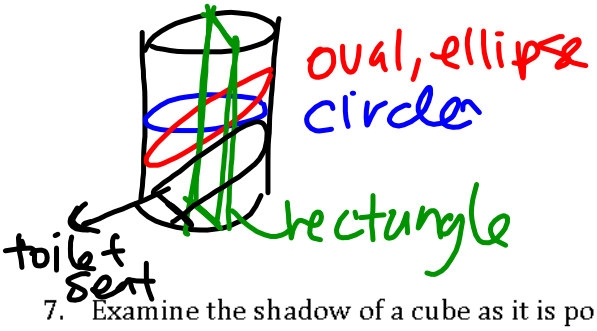
   Explain how you know what quadrilateral is formed by this cross section.

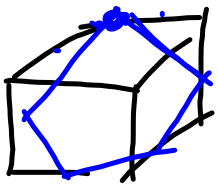


Cross sections can be visualized in many different ways. One way is to do what Jumal and Jabari did—cut a clay model of the solid with a piece of dental floss. Another way is to partially fill a clear glass or plastic model of the three-dimensional object with colored water and tilt it in various ways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

Experiment was various ways of examining the cross sections of different three-dimensional shapes. http://www.shodor.org/interactivate/activities/CrossSectionFlyer/

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.





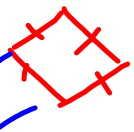
7. Examine the shadow of a cube as it is positioned in various ways in front of a light source. Which of the following shadow-shapes can be formed? Which are impossible?

a square ✓

a rhombus ✓

a rectangle ✓

a triangle ✓



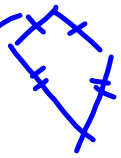
a pentagon ✓

a hexagon ✓ max

~~an octagon~~

~~a circle~~

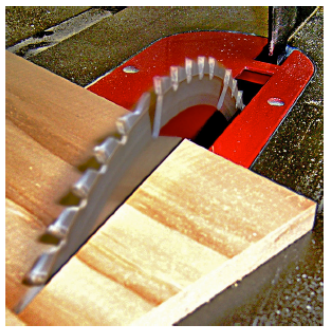
a kite ✓



Ready, Set, Go!

Ready

Topic: Comparing perimeter, area, and volume



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 lid. 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 π = 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. $\left(V = \frac{4}{3}\pi r^3\right)$

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.

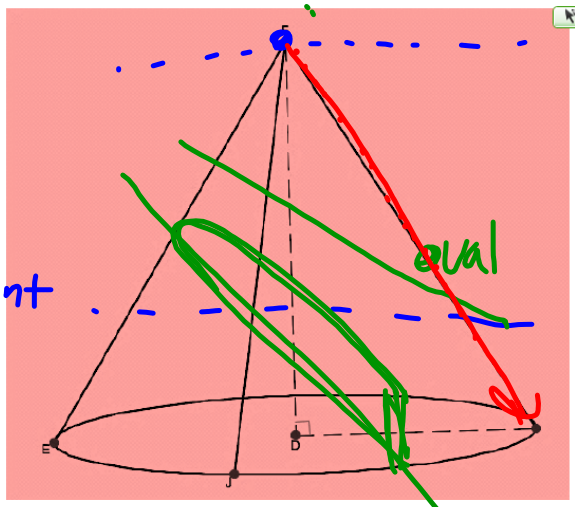
11. Which type of measurement in the problems above, would be considered a "linear measurement?"

Set

Topic: 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 cross-section? circle
Can you think of 2 possibilities? Explain.
circle, just one point



13. If the plane intersected the cone on a slant, so that it intersected segment EF and circle D, what would be the shape of the cross-section?

toilet-seat
tombstone, partial oval.

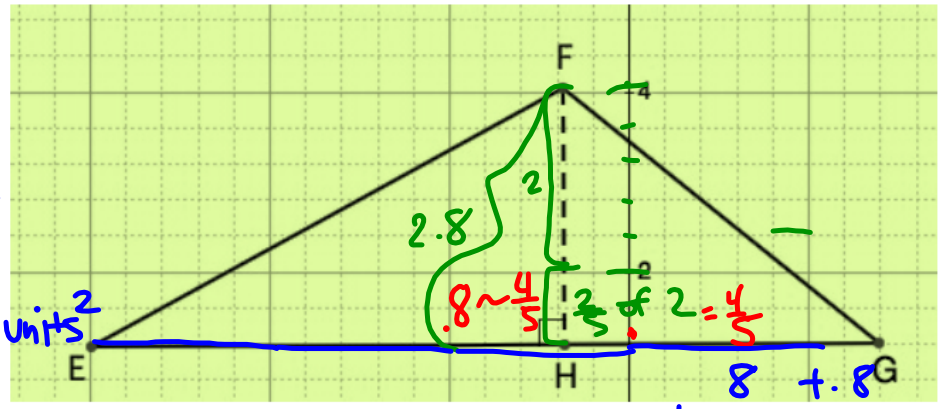
14. Describe how the plane would need to intersect the cone in order to get a cross-section that is a triangle. Would the triangle be scalene, isosceles, or equilateral? Explain.

15. Would it be possible for the intersection of a plane and a cone to be a line? Explain.
you could shave off a line on the edge of the cone, if you cut at the same angle.

Go Topic: Area of a triangle

Calculate the area of each triangle.

16.

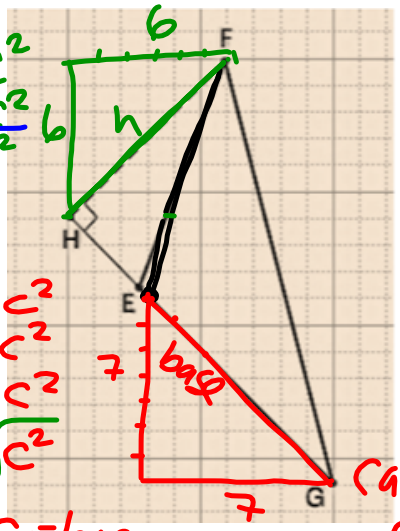


$A = \frac{b \cdot h}{2}$

$A = \frac{2.8 \cdot 8.8}{2}$

$A = 12.32 \text{ units}^2$

17.

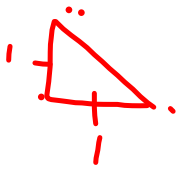


$6^2+6^2=c^2$

$36+36=c^2$

$\sqrt{72}=\sqrt{c^2}$

$8.48=0$



$a^2+b^2=c^2$

$7^2+7^2=c^2$

$49+49=c^2$

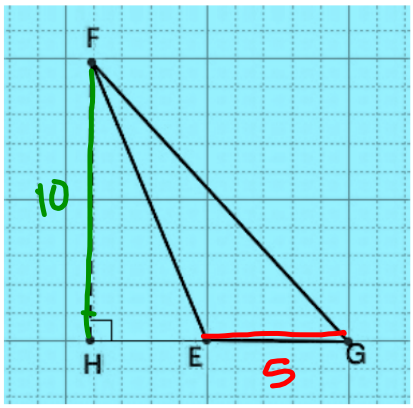
$\sqrt{98}=\sqrt{c^2}$

$9.89=c=\text{base}$

can't count diangonally!

$A=\frac{b\cdot h}{2}=\frac{9.89\cdot 8.48}{2}=41.98 \text{ units}^2$

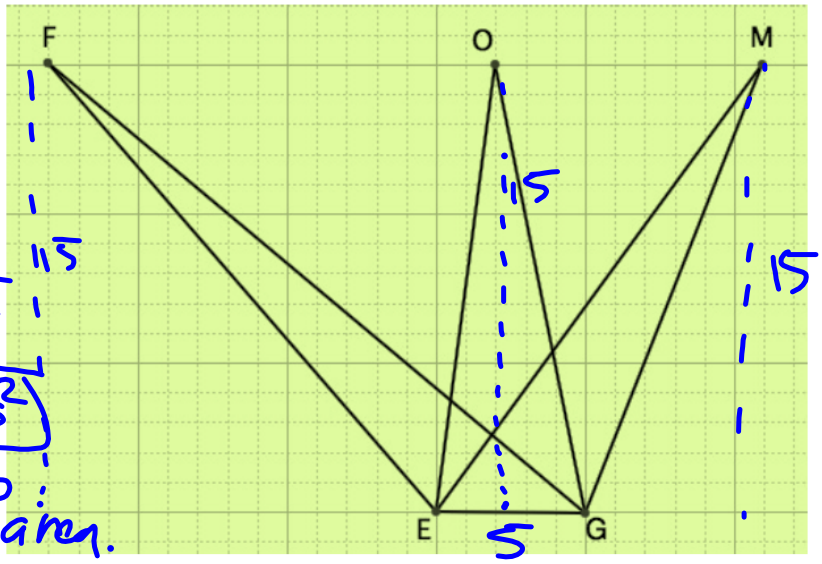
18.



$5 \cdot 10$

$\frac{50}{2} = 25$ units

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



$A = \frac{bh}{2}$

$A = \frac{5 \cdot 15}{2} = \frac{75}{2}$

$A = 37.5 \text{ units}^2$

all the triangles are the same area.