8th Grade Assignment – Week #11

Individual Work

- **Mensuration Practice Sheet #2**.

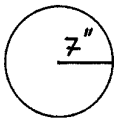
Group Assignment:

- *For Tuesday:* Work through **Mensuration Group Sheet #2**.
- *For Thursday:* **Making a Tilted Pyramid**
  You task is to construct a paper model of the tilted pyramid that I showed in today's lecture. This pyramid is the result of doing a 3-D shear and stretch where the peak of the pyramid ends up directly over one of the corners of the pyramid's square base. Therefore, the length of the edge that connects the peak to the closest corner of the square is equal to the length of the side of the square base. This edge is shorter than the other three edges that meet at the peak.
  Certainly, the challenge is to determine how to create the net for this tilted pyramid. Discuss in your group what you need to do to make this possible. You should construct the net with only a compass and straightedge. The square base of the pyramid should have 9cm edges. You should only use a ruler once – just to set your compass to 9cm to draw the initial square. There is no need to use the Pythagorean Theorem, or to do any calculations – everything can simply be done using a compass and straightedge. Of course, after you have successfully created the proper net, you should cut out, fold, and glue it together.

Mensuration – Practice Sheet #2

1) Calculate the area of each circle. Give your answers both in decimal form (using $\pi \approx 3.14$) and in fraction form (using $\pi \approx {}^{22}/_{7}$).

a)



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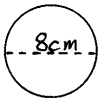
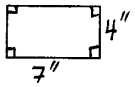


2) Calculate the area.

a)



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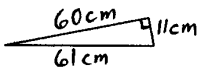

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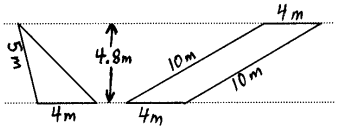

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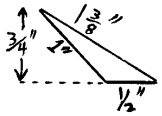

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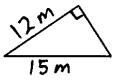

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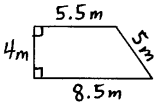
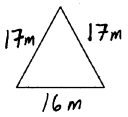


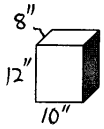
g)



h)

3) Calculate the volume.

a)



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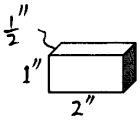

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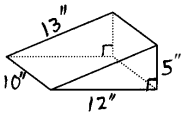


Mensuration – Group Sheet #2

1) We have seen the formula $\mathbf{V = A_{Base} \cdot H}$, which is used for calculating the volume of a box, a prism (e.g. triangular), or a cylinder.

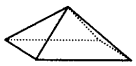
Around 430 B.C., Democritus, who was Greek, discovered that the volume of a pyramid is exactly ⅓ the volume of the box that it fits into (i.e., they have the same base and height). Similarly, the volume of a cone is ⅓ the volume of the cylinder that it fits into.

This gives us the formula:

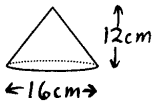
$$\mathbf{V = \tfrac{1}{3} A_{Base} \cdot H}$$

Calculate the volume of each solid.

a) A pyramid has a total height of 150 feet, and its square base measures 200 feet on each side.



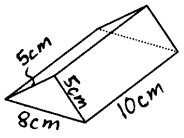
b) A cone.



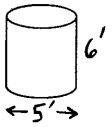
2) Surface area is the sum of all of the areas of the faces that make up a solid.

Calculate the volumes and surface area.

a)



b)



3) a) How many square inches are in a square foot?

b) How many cubic inches are in a cubic foot?

4) Jon has a cylinder, a sphere, and a cone that all have the same diameter and height. He calculates that the volume of each solid is 165 in^3, 110 in^3, and 55 in^3, respectively.

a) What is the ratio of the volume of the cylinder to the sphere to the cone? (This ratio is known as *Archimedes' Ratio*. He discovered it around 250B.C.)

b) What is the volume of a sphere that has a diameter of 18cm?