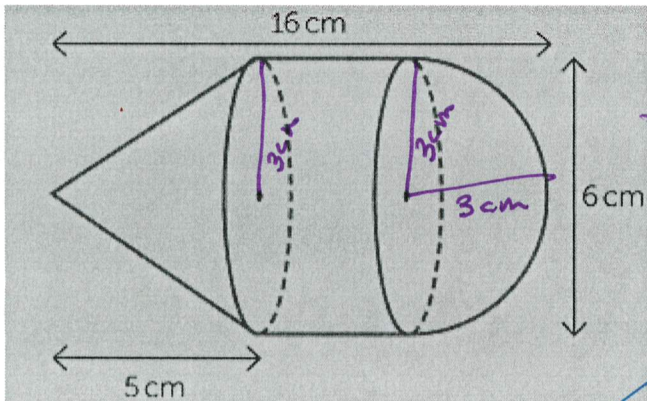
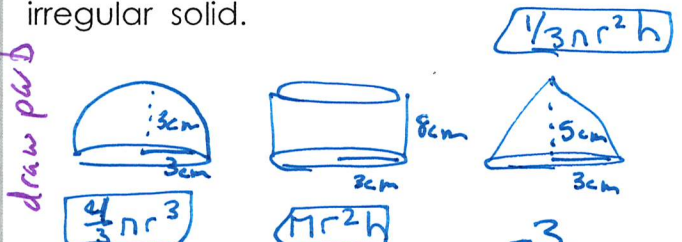


## Free Response



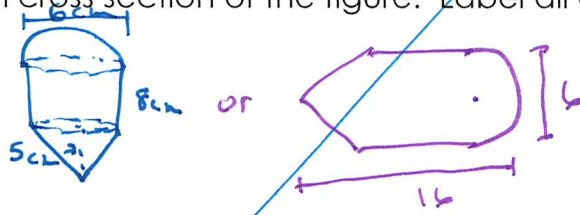
1. Redraw the 3 solids that make up this irregular solid.



2. The radius for all the shapes is 1.5 cm. Draw these into your simple solids.

3. Draw a complete horizontal cross section of the figure. Label all dimensions.

match with arrows  
imagine if cut in 1/2



4. The 3 formulas you will need to find the volume of the pencil are:

match with arrows

$\frac{4}{3}\pi r^3$

$\frac{1}{3}\pi r^2 h$

$\pi r^2 h$

Match them to the appropriate shapes you drew in part 1.

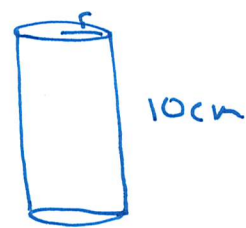
5. Calculate the volume of the <sup>Shape</sup>pencil. Round your answer to the nearest hundredth OR leave in terms of  $\pi$  for one extra credit point. **SHOW ALL WORK AND USED FORMULAS**

add the 3 parts

$$\frac{4}{3}\pi(3)^3 + \pi(3)^2(8) + \frac{1}{3}\pi(3)^2(5) = 114\pi \text{ cm}^3 \text{ or } 358.14 \text{ cm}^3$$

6. Not all pencils are created equal. Skribblez created a jumbo pencil that is 10 inches long and has a volume of  $5\pi \text{ in}^3$ . To save on cost, this pencil has no eraser (sold separately at Skribblez.com) and the pencil does NOT come pre sharpened. What is the radius of the jumbo pencil?

draw + label figure

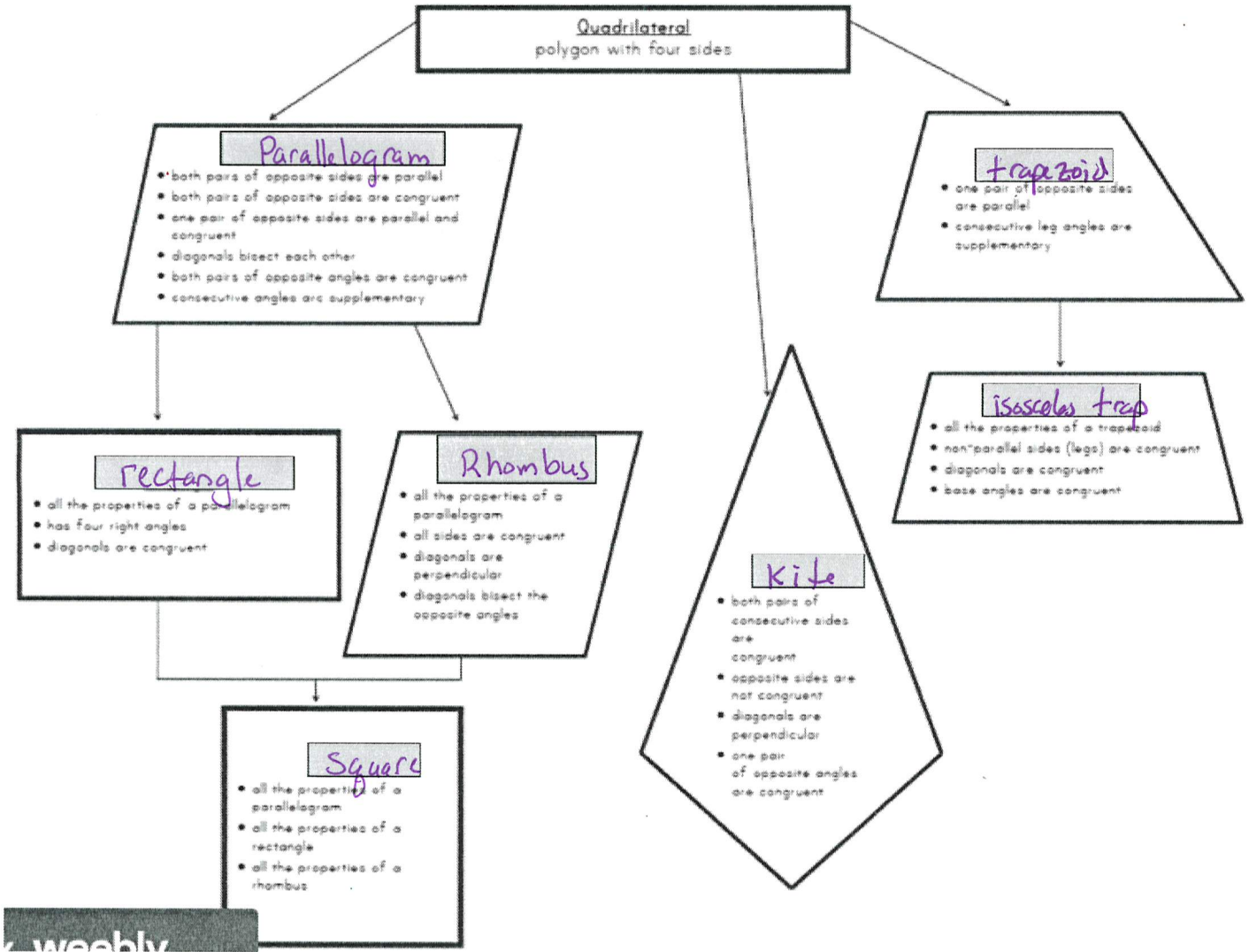


$$5\pi = \pi r^2 \cdot h = \pi r^2 \cdot 10$$

$$\frac{5\pi}{10\pi} = \frac{\pi r^2 \cdot 10}{10\pi}$$

$$\sqrt{\frac{1}{2}} = \sqrt{r^2} \quad r = .707 \text{ or } \frac{1}{\sqrt{2}}$$

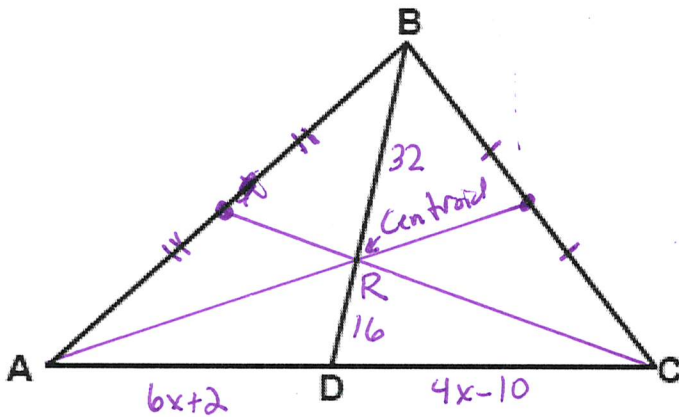
1. Write in the appropriate quadrilateral name in the empty location.



Trapezoid      Parallelogram      Square      Rhombus      Isosceles Trapezoid  
 Kite      Rectangle      Quadrilateral

2. Use a compass and ruler to find the location of the centroid for triangle ABC. Segment BD, a median, is already drawn.

a) Find the point of concurrency by drawing in the other 2 medians and label this point R.



b) Label segment  $AD=6x+2$  and segment  $DC=4x-10$ . What must  $x$  equal so that  $D$  is a median?

$$6x+2 = 4x-10$$

$$2x = -12$$

$$x = -6$$

c) If segment  $BD=48$ , then what must Segment  $BR$  equal? And what must segment  $DR$  equal?

$$48/3 = 16$$

$$BR = 32$$

$$DR = 16$$

d) Each of the points of concurrency in triangles have special properties. What special property does the centroid have and how could you use that property to hang this triangle from your ceiling.

It is the center of mass of a triangle.  
 The triangle would balance on this point when hung from the ceiling.