10.3 #12

a) For the cylinder the volume is given by

$V = \text{Area of Base} \times \text{height}$

$= [\pi (3.1)^2] \times [20.3] \quad (cm^3)$

$\approx 612.9 \ cm^3$

✓ $\boxed{\text{So, the cylinder's volume is approximately } 613 \ cm^3}$

The cylinder's surface area is given by

$SA = 2(\text{Area of base}) + (\text{Area of "sides"})$

$\approx 2(\pi(3.1)^2) + [\pi(6.2)]20.3 \quad (cm^2)$

$\approx 455.8 \ cm^2$

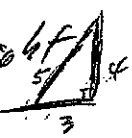
✓ $\boxed{\text{So, the cylinder's surface area is approximately } 456 \ cm^2}$

See next page for #12b

10.3 #14

a) The volume of the figure made up of a cone on top of a cylinder is given by

$V = \begin{bmatrix}\text{volume of} \\ \text{cone}\end{bmatrix} + \begin{bmatrix}\text{volume of} \\ \text{cylinder}\end{bmatrix}$. Note the cone's height is 4 cm



$= \frac{1}{3}[(\pi)(3)^2](4) + [\pi(3^2)](12.7) \ cm^3$

$\approx 396.8 \ cm^3$

✓ $\boxed{\text{So, the volume of this object is approximately } 396.8 \ cm^3}$

b) The volume of the cone is given by

$V \approx \frac{1}{3}(\text{Area of Base})(\text{height})$. In this case the height is 16 cm

$\approx \frac{1}{3}(\pi(12)^2)(16)$

$\approx 2412.7 \ cm^3$

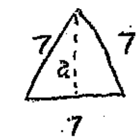
✓ $\boxed{\text{So, the volume of the cone is approximately } 2412.7 \ cm^3}$

10.3 #12b

For the hexagonal pyramid the volume is given by

$$V = \frac{1}{3}\begin{bmatrix}\text{Area of} \\ \text{Base}\end{bmatrix} \times \text{height.}$$

The area of the base is six times the area of an equilateral triangle with sides of length 7 cm.



The altitude of such a triangle is found by $(3.5)^2 + a^2 = 7^2$.

$a \approx 6.1$ cm.

So, $V \approx \frac{1}{3}\left[6\left(\frac{1}{2} \times 6.1 \times 7\right)\right]24 \approx 1024.8$

✓ $\boxed{\text{So the volume of the pyramid is about } 1025 \text{ cm}^3}$

The surface area of the pyramid is given by

$$SA = 6\begin{bmatrix}\text{Area of} \\ \text{triangular} \\ \text{face}\end{bmatrix} + \begin{matrix}\text{Area of} \\ \text{Base}\end{matrix}$$

$$\approx 6\left[\frac{1}{2}(7)(24.8)\right] + \left[6\left(\frac{1}{2} \times 6.1 \times 7\right)\right]$$

$$\approx 649 \text{ cm}^2$$

✓ $\boxed{\text{So the surface area of the pyramid is about } 649 \text{ cm}^2}$