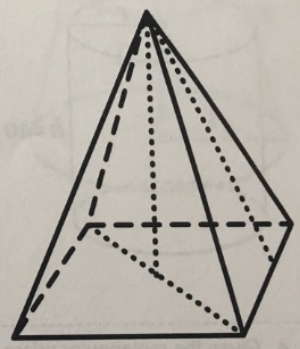
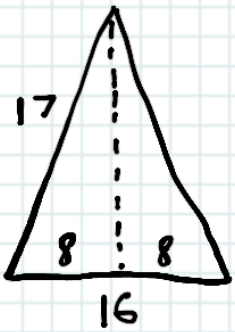
1.. Given the square pyramid below:

Area of the base = 256 un^2.
Length of a lateral edge = 17 un.

a.. Find the lateral surface area.



Base = 256 un^2 so one side of square is 16 un



$17^2 - 8^2 = 225$ $h = 15$ un

area of this triangle is $\frac{1}{2} bh = 8 \cdot 15 = 120$ un^2

$120 \cdot 4$ sides is 480 un^2

b.. Find the volume.

The lateral height is 15", we have this right triangle

$15^2 - 8^2 = 161$ so $h = \sqrt{161}$

Volume of this shape is $\frac{1}{3} BH$

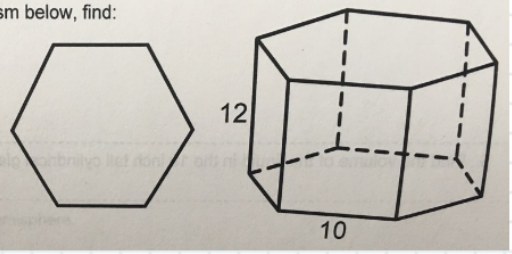
$\frac{1}{3} 256\sqrt{161} \approx 1082.76$ in^3

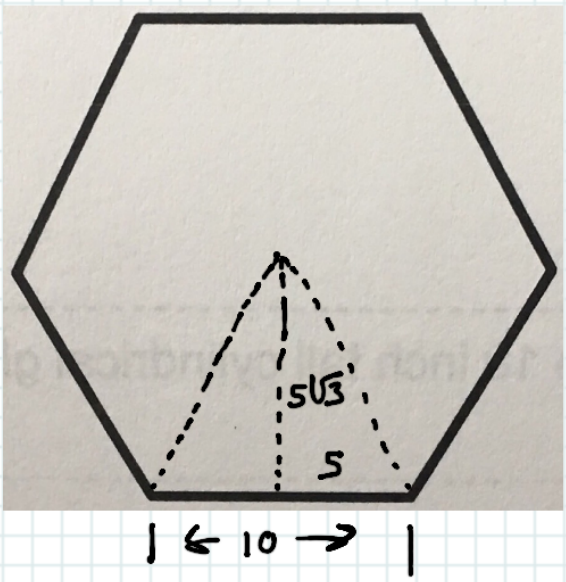
↑

stay with this

2.. Given the regular hexagonal prism below, find:

a.. total surface area.





The hexagon divides into 6 triangles, all equilateral.

Area = $\frac{1}{2}BH = \frac{1}{2}(10)(5\sqrt{3}) = 25\sqrt{3}$

Total area is $150\sqrt{3}$

Top & Bottom add to $300\sqrt{3}$ and

6 sides are each 120, 720 sides

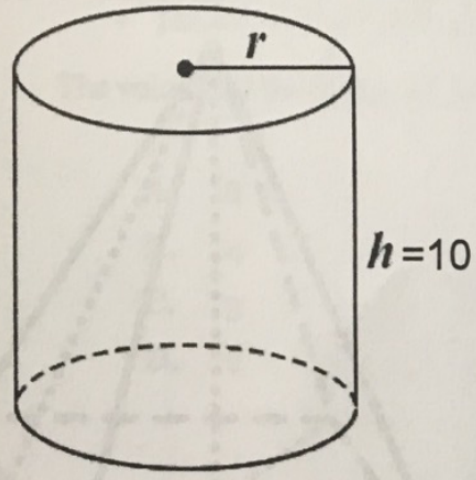
$720 + 300\sqrt{3}$ sq un. <u>total</u>

b.. volume.

Volume is base times height.

$150\sqrt{3} \cdot 12 = 1800\sqrt{3}$ un^3

3.. If the lateral surface area of the cylinder below is 80π un^2, find the volume of the cylinder.



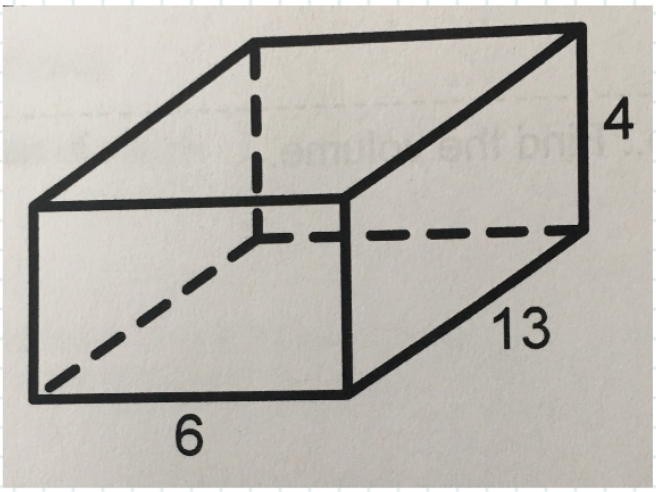
"Label area = $2\pi rh$ $\quad 80\pi = 2\pi r\, 10$

$80\pi = 20\pi r \quad r = 4$

Volume = Base • Height

$\pi\, 4^2 \cdot 10 = 160\pi$ un^3

#4



a) volume

length · width · height

$13 \cdot 6 \cdot 4 = 312 \text{ un}^3$

b) tot surface area - there are six sides,

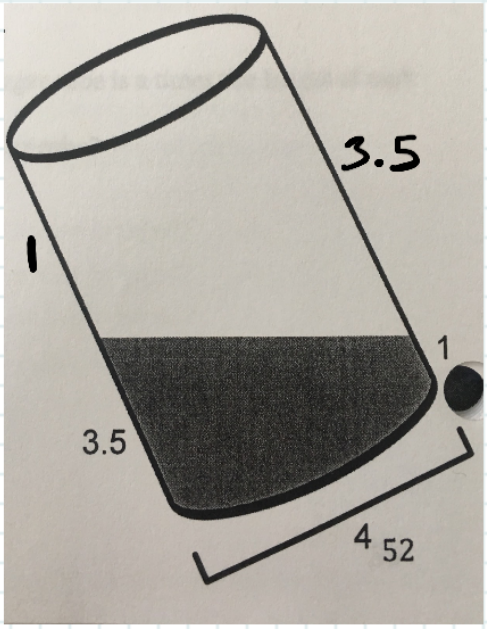
$2 \cdot 6 \cdot 4 = 48$

$2 \cdot 6 \cdot 13 = 156$

$2 \cdot 4 \cdot 13 = \underline{104}$

308 un^2

#5



I don't care that the cylinder is 10 in high! Let's assume it's 4½.

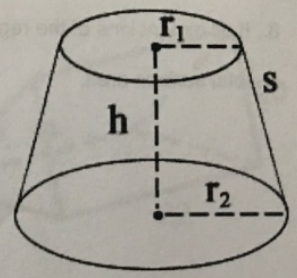
The whole volume is B·H

$\pi 2^2 (4.5) = 18\pi \text{ u}^3$ and the liquid is ½ of this.

$\underline{\underline{9\pi \text{ u}^3}}$

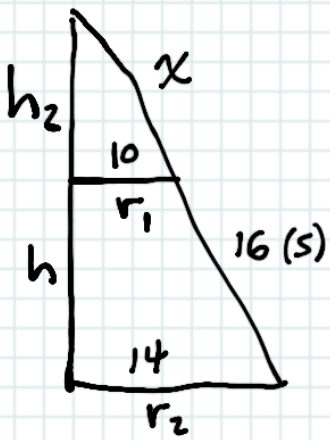
Find the volume of the frustum. #frustum

$r_1 = 10$
$r_2 = 14$
$s = 16$



#6

We need the height of the 'missing' cone, as well as the total height.



We have similar triangles →

$$\frac{\text{hyp}}{\text{base}} \quad \frac{x}{10} = \frac{16+x}{14}$$

cross mult

$$14x = 160 + 10x$$
$$4x = 160$$
$$x = 40$$

$$h_2 = \sqrt{1600-100} = \cancel{10}\sqrt{15}$$

$$h + h_2 = \sqrt{56^2 - 14^2} = \sqrt{2940} = 14\sqrt{15}$$

Big cone vol $= \frac{1}{3}\pi\, 14^2\, 14\sqrt{15} = \frac{1}{3}\pi\, 2744\sqrt{15}$

Small cone vol $= \frac{1}{3}\pi\, 10^2\, 10\sqrt{15} = \frac{1}{3}\pi\, 1000\sqrt{15}$

Net $= \frac{1}{3}\pi\, 1744\sqrt{15}$

#7 Earth diameter 7917.5 m.

a) Volume $= \frac{4}{3}\pi r^3 = \frac{4}{3}\pi\left(\frac{7917.5}{2}\right)^3$

$= 259,874,004,352 \text{ miles}^3$

$\frac{1}{2} = 129,937,002,176 \text{ miles}^3$

or $1.29937 \times 10^{11} \text{ miles}^3$

b) Area $= 4\pi r^2 = 4\pi\left(\frac{7917.5}{2}\right)^2$

$= 196,936,410 \text{ miles}^2$

$\frac{1}{2} = 98,468,205 \text{ miles}^2$

or 9.84682×10^7

8.. If all dimensions of the regular hexagonal prism from problem number 2 were tripled, find:

a.. total surface area.

Was $720 + 300\sqrt{3}$ un^2

3x the dimensions

gives 9x area.

$= 6480 + 2700\sqrt{3}$ un^2

b.. volume.

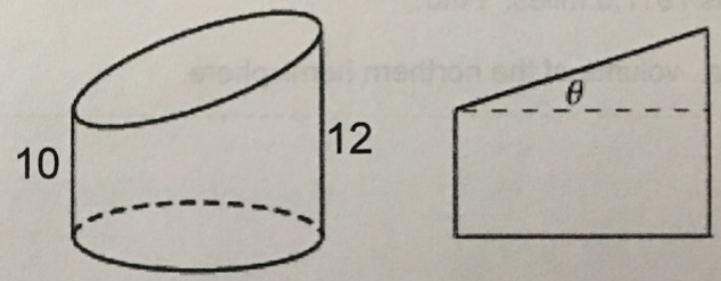
Was $1800\sqrt{3}$

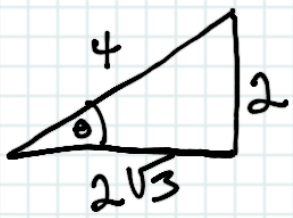
3x the dimensions

gives 3^3 or 27x vol.

$= 48600\sqrt{3}$ un^3

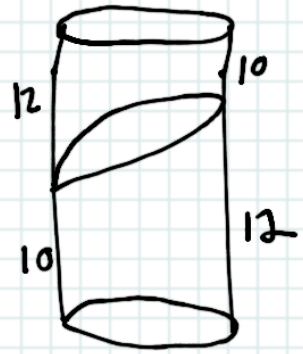
9.. Shown below is a cylinder cut off at an angle and a cross section of that cylinder. If the measure of the angle marked $\theta = 30^o$, Find the volume of the figure.





so radius of figure is $\sqrt{3}$

2 of these look like



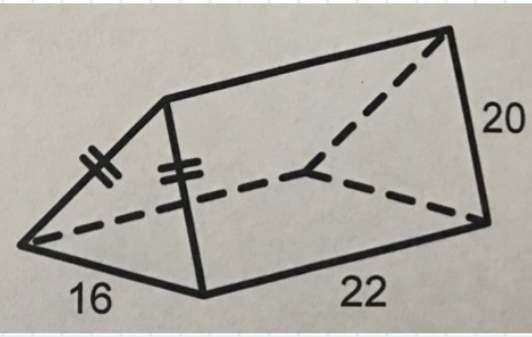
$Vol = BH = \pi(\sqrt{3})^2\, 22 = 66\pi$

½ the vol is 33π

Note: the result is the same as taking the average of the 2 heights, just use $h = 11$

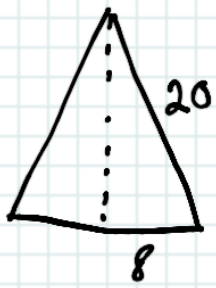
10.. Given the triangular prism, find:

a.. lateral surface area.



$(16+20+20) \times 22 = 1232 \text{ un}^2$

b tot lateral



$h = \sqrt{20^2 - 8^2} = \sqrt{336}$

$= 4\sqrt{21}$ $\quad 32\sqrt{21}$ for area of 1 triangle

$= 1232 + 64\sqrt{21} \text{ un}^2$

c vol $= 22 \cdot 32\sqrt{21} = 7040\sqrt{21} \text{ un}^3$

11 a area is $16x$ or $16 \times 1232 = 19713 \text{ un}^2$

b. add $16 \times 64\sqrt{21} = 1024\sqrt{21}$ for tot surface

c. Vol is 4^3 or $64x$ so $64 \cdot 7040\sqrt{21}$

$= 450560\sqrt{21}$