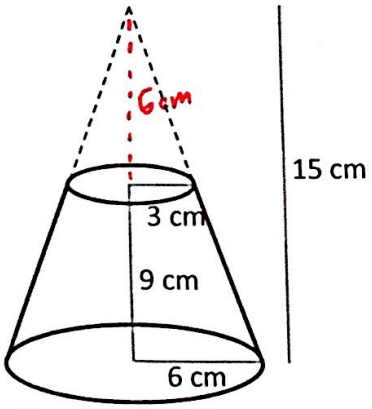
Name: _____

Area and Volume: Extension Problems

Find the volume of the following figures:

1) Frustum (cone without a tip)



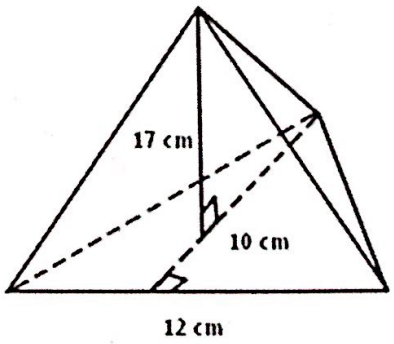
V = Cone − Tip

$V = \frac{1}{3}\pi \cdot 6^2 \cdot 15 - \frac{1}{3}\pi \cdot 3^2 \cdot 6$

$V \approx 565.5 - 56.5$

$V \approx 508.9\ cm^3$

2) Triangular pyramid

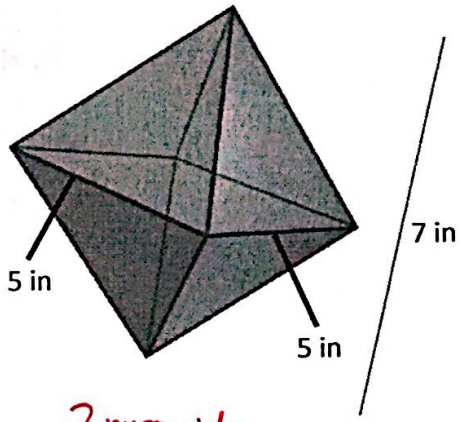


$V = \frac{1}{3}(\text{Area of base}) \cdot h$

$V = \frac{1}{3}\left(\frac{1}{2} \cdot 12 \cdot 10\right) \cdot 17$

$V = 340\ cm^3$

3) Octahedron



2 pyramids

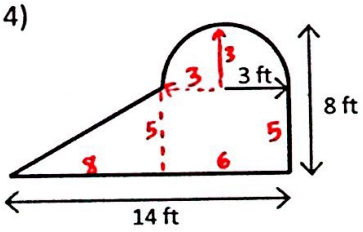
$V = 2\left(\frac{1}{3} \cdot 5 \cdot 5 \cdot 3.5\right)$

$V \approx 2(29.1\overline{6})$

$V = 58.\overline{3}\ in^3$

Find the area:

4)



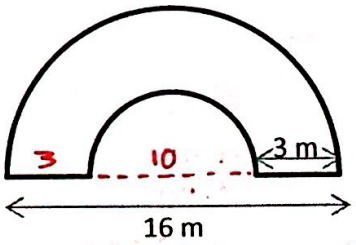
$\triangle = \frac{1}{2} \cdot 8 \cdot 5 = 20$

$\square = 6 \cdot 5 = 30$

$\cap = \frac{1}{2}(\pi \cdot 3^2) \approx 14.1$

$64.1\ ft^2$

5)

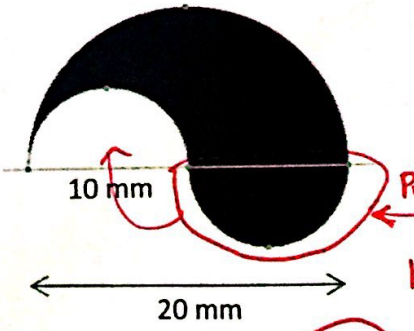


$A = \frac{1}{2}(\pi \cdot 8^2) - \frac{1}{2}(\pi \cdot 5^2)$

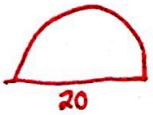
$A \approx 100.53 - 39.26$

$A \approx 61.3\ m^2$

6)



Put this on the other side, it becomes a semicircle.

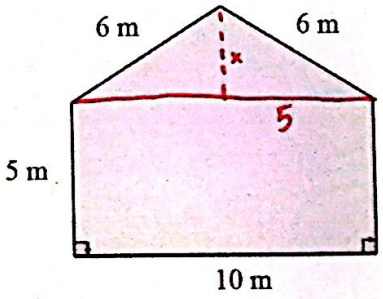


$A = \frac{1}{2}(\pi \cdot 10^2)$

$A = \frac{1}{2}(314.16)$

$A \approx 157.1\ mm^2$

7)



$x^2 + 5^2 = 6^2$

$x \approx 3.3$

$A = \square + \triangle$

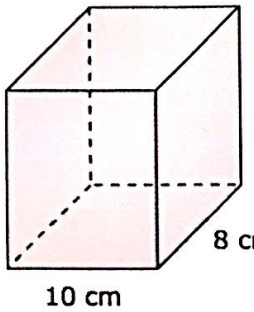
$A = 10 \cdot 5 + \frac{1}{2}(10)(3.3)$

$A = 50 + 16.6$

$A \approx 66.6\ m^2$

Find the surface area (sum of the areas of all faces):

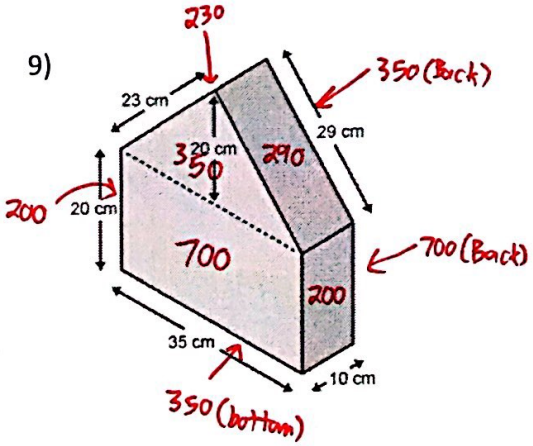
8)



Bottom = 80
Top = 80
Left = 96
Right = 96
Front = 120
Back = 120

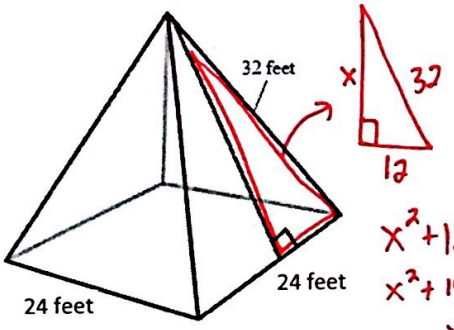
$SA = 592 cm^2$

9)



$SA = 3370 cm^2$

10)



$x^2 + 12^2 = 32^2$

$x^2 + 144 = 1024$

$x^2 = 880$

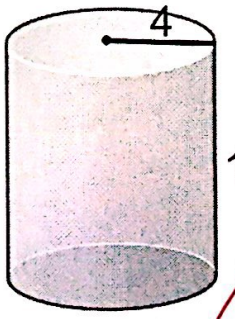
$x = \sqrt{880} \approx 29.7$

Each triangle: $\frac{1}{2} \cdot 24\sqrt{880}$

≈ 355.98

$SA \approx 1999.9 ft^2$

11) Cylinder – there are two circles, plus a curved surface around the side. To think about how to find the area of the curved part, look at the diagram at the bottom. If you "unwrap" the curved part, it would make a rectangle. What would the length and width of this rectangle be?



circumference of circle = length

height of cylinder = width

$(2\pi \cdot 4) \cdot 12$

301.6

$\pi \cdot 4^2$

50.3

$\pi \cdot 4^2$

50.3

$A \approx 402.1$ units^2