

**AW Math 11**

**Day 5: Volume of Prisms, Cylinders, Spheres, Cones & Pyramids**

**Volume:** The amount of space a 3D object occupies  
 • measured in cubic units (cm<sup>3</sup>, m<sup>3</sup>, ft<sup>3</sup>...)

**Prism:** 2D shape with equal lateral sides

Draw 2 example PRISMS, name them, and write the appropriate volume formula.

Rectangular prism



$$V = L \times w \times H$$

Triangular prism



$$V = (\text{Base area}) \times \text{height}$$

$$= \frac{B \times h}{2} \times H$$

**Volume formula for a Cylinder:**  $V = (\text{Base area}) \times \text{Height}$

Ex.



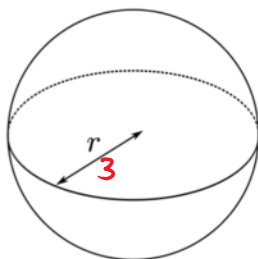
$$V = \pi r^2 \times h$$

$$V = \pi \times 2^2 \times 6$$

$$V = \boxed{75.4 \text{ ft}^2}$$

**Volume formula for a Sphere:**  $V = \frac{4}{3} \pi r^3$

Ex.

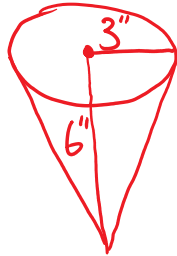


$$V = \frac{4}{3} \times \pi \times 3^3$$

$$= \boxed{113.09 \text{ ft}^2}$$

Volume formula for a Cone:  $V = \frac{1}{3} \pi r^2 h$

Ex.



$$V = \frac{1}{3} \times \pi \times 3^2 \times 6$$

$$= 56.5 \text{ in}^3$$

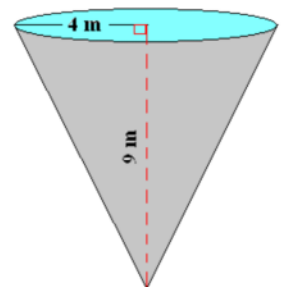
Volume formula for a Pyramid:  $V = \frac{1}{3} (\text{base Area}) (\text{Height})$

Ex.  $\rightarrow$  Go to Example 3

~~Example 1:~~

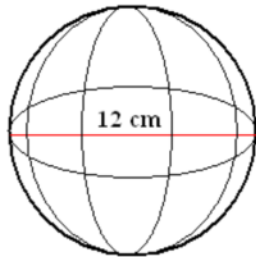
A cone-shaped grain container is 9 m high and has a radius of 4 m. What is its volume?

**Note:** A cone of the same radius and height as a cylinder has \_\_\_\_\_ volume of the cylinder.



~~Example 2:~~

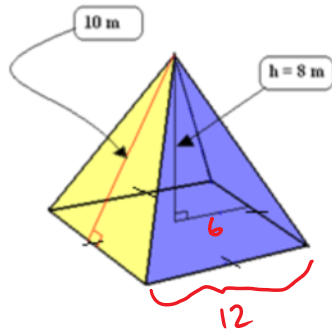
If a model of the globe with a diameter of 12 cm is submerged in water, **how much water will it displace?**



~~BBB~~

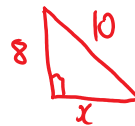
**Example 3: Volume of pyramid**

You are told that the pyramid below is a square-based pyramid. Given that the slant height is 10 metres and the height of the pyramid is 8 metres, **what is the volume of the pyramid?**



$$V = \frac{1}{3} \times (\text{base area}) \times \text{Height}$$

Find Base:



$$10^2 - 8^2 = 36$$

$$\sqrt{36} = 6$$

$$2 \times 6 = 12$$

$$\begin{aligned} \text{Base area} &= L \times W \\ &= 12 \times 12 \end{aligned}$$

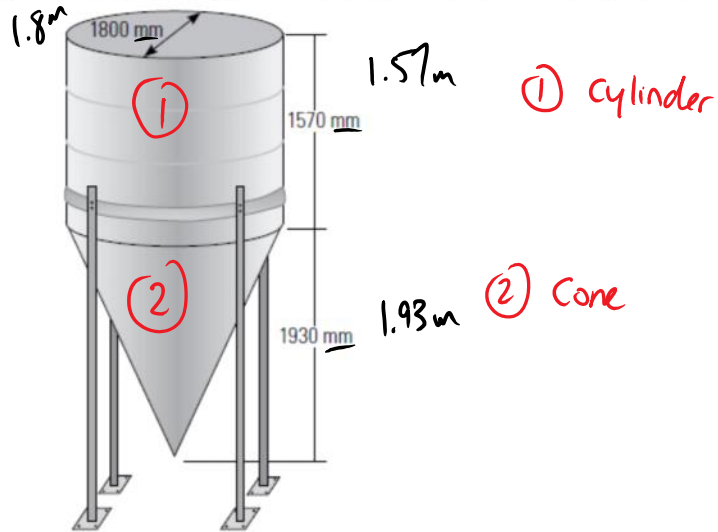
$$\text{Base area} = 144$$

$$\begin{aligned} V &= \frac{1}{3} \times 144 \times 8 \\ &= 384 \text{ m}^3 \end{aligned}$$

don't . Assignment pg 28-30  
don't do 2b)  
h

Day 5 Assignment: Volume

1) A steel storage silo for livestock feed pellets is shown below.



a) What different basic shapes are in the figure, not including the stands?

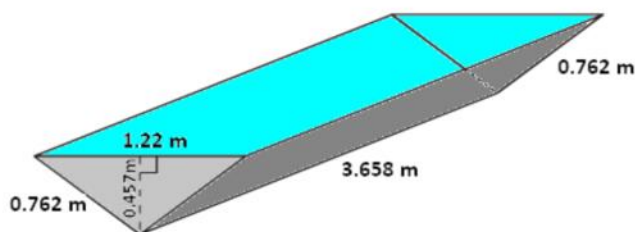
b) What is the volume in cubic metres?

2) Zak has a contract to supply hanging planter baskets to the city to be hung from lampposts along the main street. The baskets are *hemispherical* with a diameter of 50 cm. He needs 48 baskets.

a) How much potting soil, in litres, does he need to fill all the baskets?

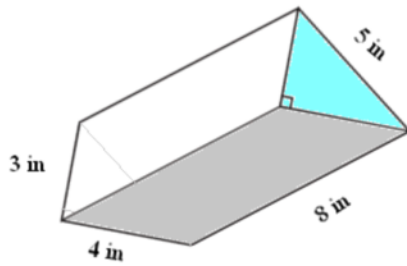
b) Zak can buy a 60-litre bag of soil for \$13.50 or a cubic yard for \$41.50. Which is the cheaper option? (One cubic yard equals 27 cubic feet; one cubic foot equals 28.23 litres.) *Explain your choice.*

3) Matthew built a triangular trough for his cattle. If the trough is 3.658 m long, 0.457 m high, and 1.22 m wide, what is its volume? How much water does it hold when totally full? ( $1\text{m}^3 = 1000$  litres)



4) Find the volume. Show your work to the right of the diagrams.

a)



b)

