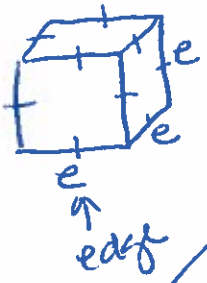
Chapter 11

Volume: is the space that a figure occupies for 3-Dimensional figures.

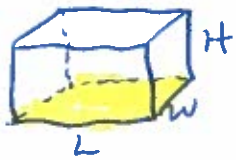
Cube

(all faces are squares)



$V = e^3$

Rectangular Prism (think Box)



$V = B \cdot H$

B: Base is a rectangle

$V = L \cdot W \cdot H$

All Brisms are

$V = B \cdot H$

B: area of base; H: height of prism

Triangular Prism

$V = B \cdot H$

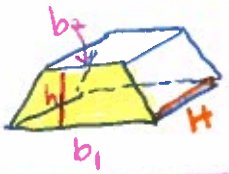
Base is a triangle

$V = \frac{1}{2}bh \cdot H$

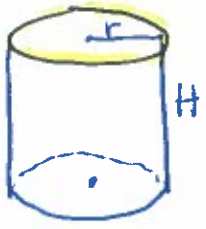
Trapezoidal Prism

$V = B \cdot H$

$V = \frac{1}{2}h(b_1 + b_2) \cdot H$



Cylinder



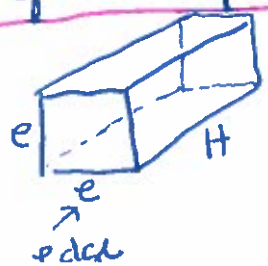
$V = B \cdot H$

Base is a circle

$V = \pi r^2 \cdot H$

* A cylinder is NOT a circular prism.

Square prism (not a cube)



$V = e \cdot e \cdot H$

OR

$V = e^2 \cdot H$

Pyramids & Cones

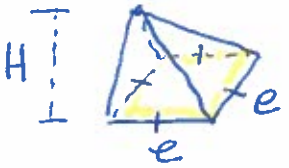
$$V = \frac{1}{3} B \cdot H$$

B ↑ area of base

H ↖ height of pyramid or cone

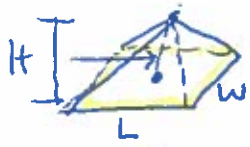
Square pyramid

$V = \frac{1}{3} \cdot e^2 \cdot H$



rectangular pyramid

$V = \frac{1}{3} \cdot L \cdot W \cdot H$



trapezoidal pyramid

$V = \frac{1}{3} \cdot \left(\frac{1}{2} h(b_1 + b_2)\right) \cdot H$

Cone ← a cone is NOT a circular pyramid

$V = \frac{1}{3} \pi r^2 H$

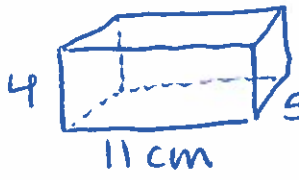
Sphere (Ball)

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

a sphere is not a prism or a pyramid.

A pyramid, cylinder, prism and cone can be oblique. Oblique means it looks slanted. Oblique pyramids, cylinders, cones & prisms have the same volume as when they are right. Right means straight up & down.

Volume Examples:

① 

rectangular prism $V = L \cdot W \cdot H$

$V = (11)(5)(4)$

$L \cdot W \cdot H$

$V = 220\ cm^3$

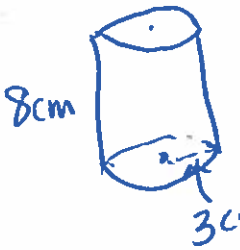
② 

$V = 5^3$

$V = 125\ in^3$

cube

③ Leave cylinders + cones in π form

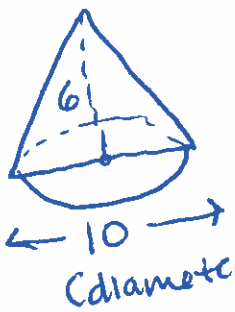


$V = \pi r^2 H$

$V = \pi \cdot 3^2 \cdot 8$

$V = \pi \cdot 9 \cdot 8$

$V = 72\pi\ cm^3$

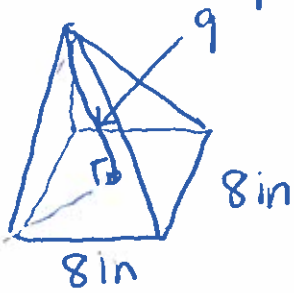
④ 

$V = \frac{1}{3}\pi \cdot r^2 H$

$V = \frac{1}{3}\pi \cdot 5^2 6$

$V = \frac{1}{3}\pi \cdot 25 \cdot 6$

$V = 50\pi\ un^3$

⑤ square pyramid 

$V = \frac{1}{3}(8 \cdot 8) \cdot 9$

$V = \frac{1}{3} \cdot 64 \cdot 9$

$V = 192\ in^3$

⑥ The circumference of a tennis ball is 4 in. What is the volume of the ball? to nearest tenth.

$C = 2\pi r$

$4 = 2\pi r$

$\frac{4}{(2\pi)} = r$ $\quad r \approx .636619$

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

$V = \frac{4}{3} \cdot \pi \cdot \left(\frac{4}{2\pi}\right)^3$

$V = 1.08075$

$V \approx 1.1\ in^3$

HW: p. 654-655 (12-20, 25-27)

* must show work
* Find volume only
No surface area