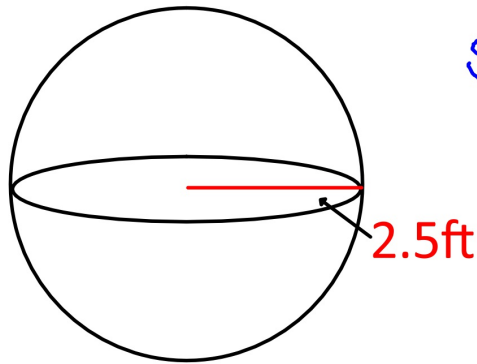


MDI:

Find the surface area



Sphere
 $SA = 4\pi r^2$
 $= 4(3.14)(2.5)^2$
 $= 4(3.14)(6.25)$
 $= 78.5 \text{ ft}^2$

LAUNCH: in your notes

What do you already know about volume?

- what is the first thing that comes to mind?
- what is volume?
- what kinds of objects have volume?
- do you know how to calculate an object's volume?

3.15 Volumes of Solids

Objective:

Interpret and use formulas for volumes of prisms, pyramids, cylinders, spheres and cones.

Volume is how much space a 3D object occupies.

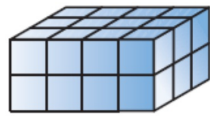
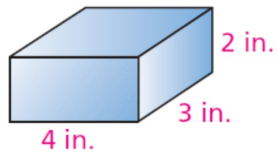
Volume is measured in cubic units.

Examples: m^3 , cm^3 , in^3 , ft^3

When you measure the volume of a solid, you are trying to determine how many cubes of a particular size would fit inside the solid.

Example:

How many cubic inches would fill this box?



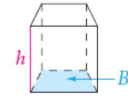
Each cube measures
1 in. by 1 in. by 1 in.

24 in³

Theorem 10-6 Volume of a Prism

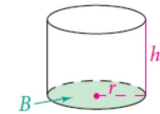
$$V = Bh$$

B = area of base
h = height



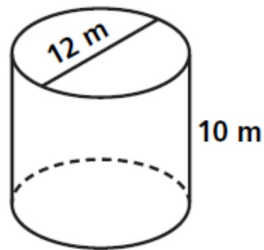
Theorem 10-7 Volume of a Cylinder

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



Volume Examples

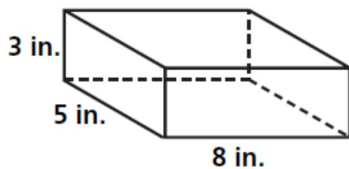
1.



Cylinder

$$V = \pi r^2 h$$
$$V = (3.14)(6)^2(10)$$
$$= (3.14)(36)(10)$$
$$= 1130.4 \text{ m}^3$$

2.



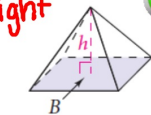
Prism

$$V = Bh$$
$$V = (5)(8)(3)$$
$$V = 120 \text{ in}^3$$

Theorem 10-8 Volume of a Pyramid

$$V = \frac{1}{3} Bh$$

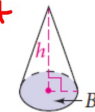
h = height



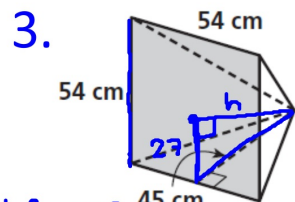
Theorem 10-9 Volume of a Cone

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

h = height



Volume Examples:



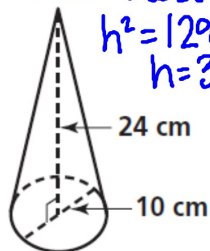
$$h^2 + 27^2 = 45^2$$

$$h^2 + 729 = 2025$$

4.

$$h^2 = 1296$$

$$h = 36$$



Pyramid $V = \frac{1}{3} Bh$

$$B = (54)(54) \quad h = 36$$

$$= 2916 \text{ cm}^2$$

$$V = \frac{1}{3} (2916)(36)$$

$$V = \boxed{34,992 \text{ cm}^3}$$

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

$$V = \frac{1}{3} (3.14)(5)^2 (24)$$

$$\frac{1}{3} (3.14)(25)(24) = \boxed{628 \text{ cm}^3}$$

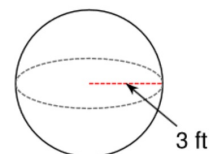
Theorem 10-11 Volume of a Sphere

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



Volume Example:

5.



For You to Do

Find the volume of each right prism.

1. a right square prism with base side length 4 cm and height 100 cm
2. a right octagonal prism with base area 145 cm^2 and height 2 cm
3. a cube with side length 3 ft
4. a cylinder with base radius 1 in. and height 1 ft

Homework/Classwork: Due with Investigation

1.

