welcome

## Volume and Surface Area 3 Volume

## Volume Basics

## Volume of a solid is the number of cubic units contained in its interior. Volume is measured in cubic " $\mathrm{u}^{3 \text { " }}$

## postulate 27 Volume of a Cube

The volume of a cube is the cube of the length of its side, or $V=s^{3}$.
postulate 28 Volume Congruence Postulate
If two polyhedra are congruent, then they have the same volume.
postulate 29 Volume Addition Postulate
The volume of a solid is the sum of the volumes of all its nonoverlapping parts.

## Volume of a Prism \& Cylinder

## Prism

The volume V of a prism is V = Bh
$\mathrm{B}=$ base area $\& \mathrm{~h}=$ height.

## Cylinder

The volume V of a cylinder is

$$
\mathrm{V}=\mathrm{Bh}=\pi r^{2} \boldsymbol{h}
$$

$B=$ circle area \& $h=$ height.


## Fish Tanks Find the volume of the tank.

7. 


8.

9.


14 in.

## Cavalieri's Principle

If two solids have the same height and the same cross-sectional area at every level, then they have the same volume.


## Volume of a Pyramid \& Cone

## Pyramid

The volume V of a pyramid is

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

$B=$ base area $\& h=$ height.

## Cone

The volume V of a cone is

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

$B=$ circle area $\& h=$ height.


Find the volume


## Volume of a Sphere

The volume $V$ of a sphere with radius $r$ is...


## Find the Volume


ball bearing

## Ratio of Similar Solids

If two solids are similar to each other and have a scale factor of $a: b$, then...


Side lengths a:b
Volume $a^{3}: b^{3}$
Surface Area $a^{2}: b^{2}$

