## Math-2A Lesson 10-6:

Volumes of Spheres, Cylinders, Cones, Pyramids, and Prisms

## What does "volume" mean?


volume $=(1$ inch $)(1$ inch $)(1$ inch $)$
volume $=1$ inch $^{3}$
volume $=1$ "cubic inch"

What is the "volume" of the shape? "how many 1 inch cubes will fit in the shape."

volume $=2$ cubic inches

Volume $_{\text {rect.prism }}=$ Area $_{\text {base }} *$ height

What is the "volume" of the shape? "how many 1 inch cubes will fit in the shape."

volume $=8$ cubic inches volume $=8$ inch $^{3}$

Volume $_{\text {rect.prism }}=$ Area $_{\text {base }} *$ height

volume $=(2$ inch $)(4$ inch $)(6$ inch $)$
volume $=48$ inch $^{3}$
volume $=48$ "cubic inches"

## What is the "volume" of the prism?


volume $=(2$ inch $)(4$ inch $)(3$ inch $)$
volume $=24$ inch $^{3}$

## What is the "volume" of the prism?


$\leftarrow 3$ in $\rightarrow \mid$

$$
\text { vol } l_{\text {prism }}=(\text { area of base } * \text { height })
$$

$$
\text { vol } l_{\text {prism }}=\left(6 \text { in }^{2}\right)(10 \mathrm{in})
$$

$$
\text { volume }=60 \text { inch }^{3}
$$



volume $_{\text {cylinder }}=\pi \mathrm{r}^{2} h$
A cone comes from a cylinder.
The volume of the cone is a what fraction of the volume of the cylinder?
$\frac{1}{3}$
volume $_{\text {cone }}=\frac{1}{3} \pi \mathrm{r}^{2} h \quad$ volume $=\frac{1}{3} \pi(2)^{2}(6)$
volume $=8 \pi$ in $^{3}$

$$
V o l_{\text {cone. }}=25.1 \mathrm{in}^{3}
$$

$$
\begin{gathered}
V o l_{\text {cyl. }}=\text { Area }_{\text {base }} * \text { height } \\
\text { Vol }{ }_{\text {prism }}=(L * w) * h \\
\text { A pyramid comes from a prism. } \\
\text { The volume of the pyramid is a what } \\
\text { fraction of the volume of the prism? } \\
\frac{1}{3} \\
\text { Vol } \\
\text { pyr. }=\frac{1}{3}\left(\text { Area }_{\text {base }} * \text { height }\right)
\end{gathered}
$$

volume $=\frac{1}{3}(4$ in $* 5$ in $) * 6$ in $\quad$ volume $=40$ in $^{3}$


The volume of a sphere is....?
volume $_{\text {sphere }}=\frac{4}{3} \pi \mathrm{r}^{3}$
What part of the formula gives us the "cubic" units?
volume $=\frac{4}{3} \pi\left(\frac{6}{2}\right)^{3}$

$$
\begin{aligned}
& \mathrm{vol}=36 \pi \mathrm{in}^{3} \\
& \mathrm{vol}=113.1 \mathrm{in}^{3}
\end{aligned}
$$



The volume of a sphere is....?
volume $_{\text {sphere }}=\frac{4}{3} \pi \mathrm{r}^{3}$

$$
\text { volume }=\frac{4}{3} \pi(2.6)^{3}
$$

$\mathrm{vol}=73.6 \mathrm{in}^{3}$

## volume $_{\text {prism }}=($ area of base $) * h$


volume $_{\text {cylinder }}=($ area base $) * h$

volume $_{\text {cone }}=\frac{1}{3}($ area base $) * h$

surf. area ${ }_{\text {sphere }}=4 \pi \mathrm{r}^{2}$
volume $_{\text {sphere }}=\frac{1}{3} * 4 \pi \mathrm{r}^{3}$

## Where is the center of the circle?

$x^{2}+y^{2}=25 \quad$ Has not been shifted left/right $\rightarrow$ center is $(0,0)$.
$(x+3)^{2}+y^{2}=25 \quad$ Left 3 shift $\rightarrow$ center is $(-3,0)$
$(x-5)^{2}+(y+2)^{2}=25 \quad$ center is $(5,-2)$
What is the radius of the circle? $\quad x^{2}+y^{2}=25$

$$
x^{2}+y^{2}=r^{2} \quad \text { radius is } 5
$$

$(x-7)^{2}+y^{2}=49 \quad$ radius is 7
$(x+2)^{2}+y^{2}=64$ radius is 8

