Day 2 Notes

Volume of Prisms & Cylinders Cont'd

$\frac{1}{10}$ cm

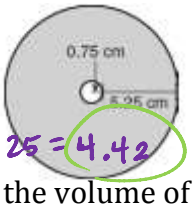
Think about it: CD's have the dimensions shown in the figure. Each CD is 1 mm thick. Find the volume in cubic centimeters of a stack of 25 CD's. Round to the nearest tenth.

1st $V = A_{Base} \cdot h$
$= 36\pi \cdot \frac{1}{10}$
$= 3.6\pi \times 25 = 282.74$

$A_{Big\,\odot} = \pi r^2$
$= \pi(6)^2$
$= 36\pi$

2nd $A_{small\,\odot} = \pi(.75)^2$
$= .5625\pi$

$V = A_{Base} \cdot h$
$= .5625\pi \cdot \frac{1}{10}$
$= .05625\pi \cdot 25 = 4.42$



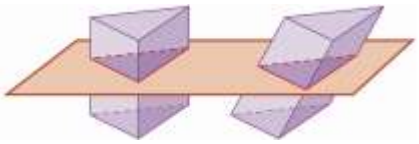
3rd $V = 282.74 - 4.42 = 278.3\,cm^3$

I accidently bump the stack and it creates a cylinder that is tilted… how does this effect the volume of the stack?

The volume stays the same ☺

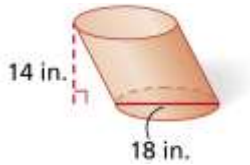
Cavalieri's Principle says that if two 3-D figures have the same height and have the same cross-sectional area at every level, they have the same volume.

So neat… ☺
A right prism and an oblique prism with the same base and height have the same volume!!!
http://www.mathopenref.com/prism.html



Directions: Find the volume of the oblique figures below. Leave your answers exact!

1.



Name of 3-D Solid: Oblique cylinder

Parallel Cross Section: Circle

Volume = $1134\pi\ in^3$

$V = A_{Base} \cdot h$
$= \pi r^2 \cdot h$
$= \pi(9)^2 \cdot 14$

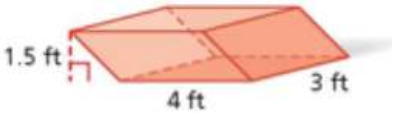
What would happen to the volume of the 3-D figure if we multiplied the height by ½?

The volume would be multiplied by ½

What would happen to the volume of the 3-D figure if we multiplied the radius by ½?

The volume would be multiplied by $\frac{1}{2} \times \frac{1}{2}$ or $\frac{1}{4}$

2.



Name of 3-D Solid: Oblique prism

Parallel Cross Section: parallelogram

Volume = $18\ ft^3$

$V = A_{Base} \cdot h$
$= (4 \cdot 3)1.5$
$= 18$

What would happen to the volume of the 3-D figure if we tripled the length, width, & height?

The volume would be multiplied by 3x3x3 or 27

Volume

3. One cup is equal to 14.375in^3. If a 1 c cylindrical measuring cup has a radius of 2 inches, what is the height?

$V = A_{Base}\ h$

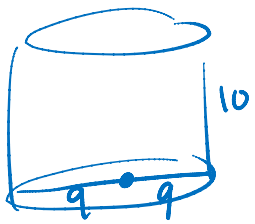
$V = \pi r^2 \cdot h$

$14.375 = \pi(2)^2 h$

$\frac{14.375}{4\pi} = \frac{4\pi \cdot h}{4\pi}$

$h \approx 1.14$ in

4. Find the volume of a cylinder with base circumference of 18π ft and a height of 10 ft.



$V = A_{Base} \cdot h$

$= \pi r^2 \cdot h$

$= \pi(9)^2 \cdot 10$

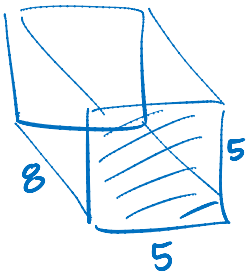
$= 810\pi$ ft^3

$C = 18\pi$

$\pi d = 18\pi$

$d = 18$ ft

5. Find the volume of a square prism with a base area of 25 in^2 and a height three more than the base edge length.



$V = A_{Base} \cdot h$

$= (25) \cdot 8$

$= 200$ in^3

$A = s^2$

$25 = s^2$

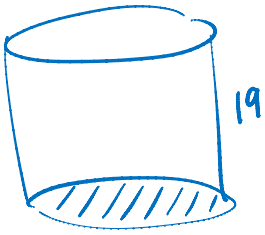
$5 = s$

so

$5 + 3 = h$

$8 = h$

6. Find the volume of a cylinder with a base area of 64 π ft^2 and a height 3 more than the diameter of the base.



$V = A_{Base} \cdot h$

$= 64\pi(19)$

$= 1216\pi$ ft^3

$A = \pi r^2$

$64\pi = \pi r^2$

$8 = r$

$16 = d$

so

$h = 16 + 3$

$h = 19$