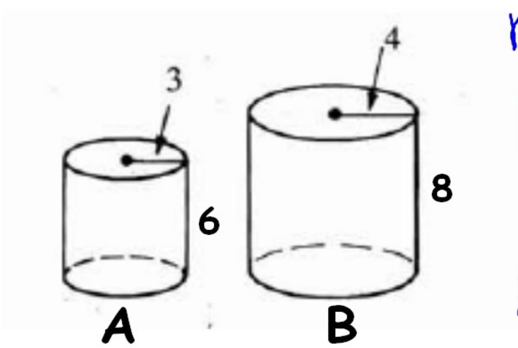
## 12-5 Areas and Volumes of Similar Solids

std. 9.0

Mar. 29

Two solids are **similar** if their bases are similar and their corresponding measurements have equal ratios.




radii $= \frac{3}{4}$

hts. $= \frac{6}{8} = \frac{3}{4}$

$V = \frac{A}{B} = \frac{\pi(9)(6)}{\pi(16)(8)} = \frac{54\pi}{128\pi}$ $\quad \pi r^2 h$

$\frac{3^3}{4^3} = \frac{27}{64}$

LAs: $\frac{A}{B} = \frac{2\pi r h}{2\pi r h} = \frac{2\pi(3)(6)}{2\pi(4)8} = \frac{36\pi}{64\pi} = \frac{9}{16}$

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

**If the scale factor of 2 similar solids is a : b, then**
**(1) the ratio of corresponding perimeters is a : b**
**(2) the ratio of base areas, lateral areas, and total areas is $a^2 : b^2$**
**(3) the ratio of volumes is $a^3 : b^3$**

**ex. 1** The volumes of 2 similar pyramids are 56 $cm^3$ and 7 $cm^3$.

$\frac{56}{7} = \frac{8}{1}$

V

$\frac{8}{1} = \left(\frac{2}{1}\right)^3$

Find: ratio of their heights

$2:1$

ratio of their total areas $2^2 : 1^2 = 4:1$

ex. 2

**The lateral areas of 2 similar cylinders are $36\pi$ and $100\pi$. The volume of the larger cylinder is $500\pi$. Find the volume of the smaller cylinder.**

LAs

$$\frac{\text{sm.}}{\text{big}} \quad \frac{36\pi}{100\pi} = \frac{9}{25} = \left(\frac{3}{5}\right)^2$$

scale

$$\frac{3^3}{5^3} = \frac{x}{500\pi} \qquad \frac{27}{125} = \frac{x}{500\pi}$$

$$\boxed{x = 108\pi}$$