Surface Area / Volume of Similar Figures

- Ratio of Sides = $\frac{a}{b}$ (Scale Factor)
- Ratio of Areas = $\frac{a^2}{b^2}$
- Ratio of Volumes = $\frac{a^3}{b^3}$

EX → Ratio of Volumes = $\frac{512}{729}$

Scale Factor = $\sqrt[3]{\frac{512}{729}} = \frac{8}{9}$

Area = $\frac{8^2}{9^2} = \frac{64}{81}$

EX → Scale Factor = $\frac{3}{5}$

Area = $\frac{3^2}{5^2} = \frac{9}{25}$

Volume = $\frac{3^3}{5^3} = \frac{27}{125}$

EX → Scale Factor = $\frac{7}{2}$

Area = $\frac{49}{4}$

Volume = $\frac{7^3}{2^3} = \frac{343}{8}$

EX → Ratio of Areas = $\frac{49}{36}$

Scale Factor = $\sqrt{\frac{49}{36}} = \frac{7}{6}$

Volume = $\frac{7^3}{6^3} = \frac{343}{216}$

EX → Ratio of areas of 2 similar figures is $\frac{81}{100}$. If the volume of the larger is 4000 cm^3, what is the volume of the smaller figure?

$\sqrt{\frac{81}{100}} = \frac{9}{10} \Rightarrow \frac{9^3}{10^3} = \frac{729}{1000}$ $\quad \frac{729}{1000} = \frac{X}{4000}$ $\quad \frac{1000X}{1000} = \frac{2916000}{1000}$

$X = 2916\ cm^3$

EX → Ratio of volumes of 2 similar figures is $\frac{8}{512}$. If the surface area of the smaller is 15 in^2, what is the surface area of the larger?

$\sqrt[3]{\frac{8}{512}} = \frac{1}{4} \Rightarrow \frac{1^2}{4^2} = \frac{1}{16}$ $\quad \frac{1}{16} = \frac{15}{X}$ $\quad X = 240\ in^2$

HW : p. 746 → 5-22