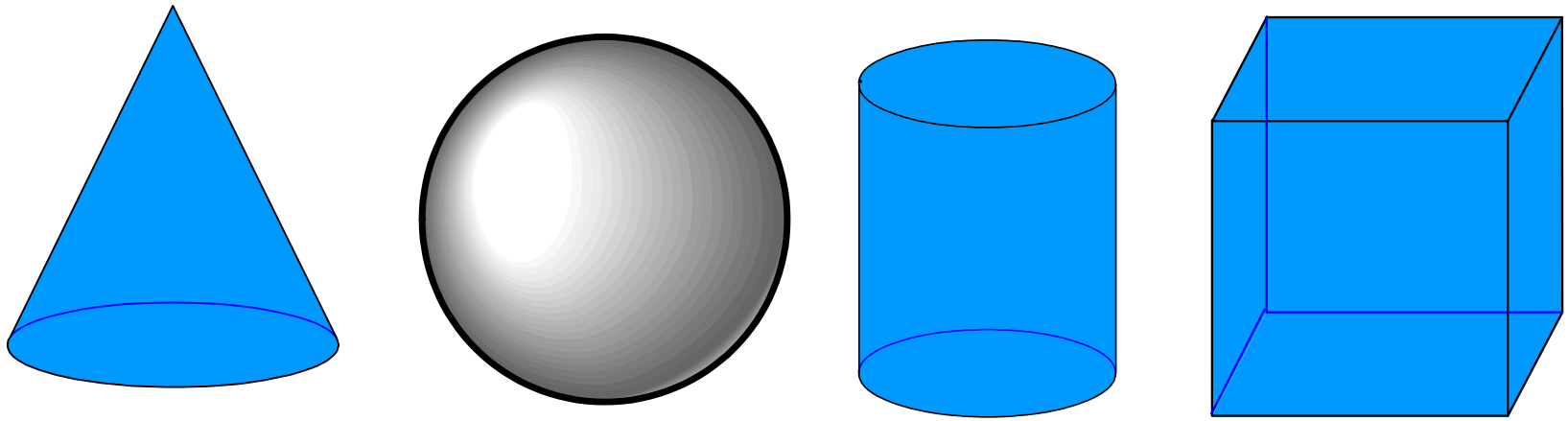
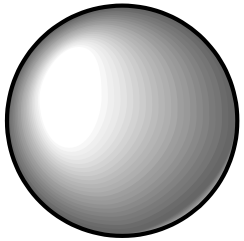
Ratios of solids with equal radii and height

VOLUME of a:

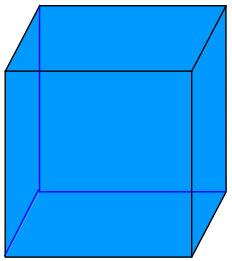
$\frac{1}{3}\pi r^2 h$ $\frac{4}{3}\pi r^3$ $\pi r^2 h$ s^3



$\frac{4}{3}\pi r^3$



s^3



(1) set side of cube equal to 2*radius ($s=2r$)

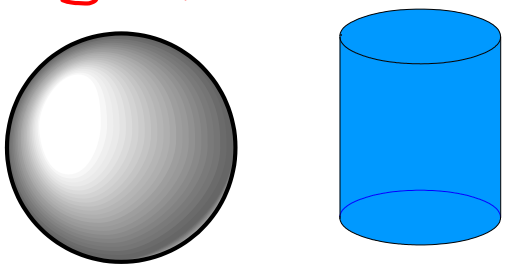
(2) volume of sphere as a ratio to the volume of the cube

$$\frac{\frac{4}{3}\pi r^3}{(2r)^3} = \frac{\frac{4}{3}\pi r^3}{2^3 * r^3} = \frac{\frac{4}{3}\pi r^3}{8 r^3}$$

$$\frac{4}{3}\pi \div 8 = \frac{4}{3}\pi * \frac{1}{8} = \frac{4\pi}{24} = \frac{\pi}{6}$$

$* \sim \frac{3.14}{6}$ = a little more than $\frac{1}{2}$

$\frac{4}{3}\pi r^3$ $\pi r^2 h$



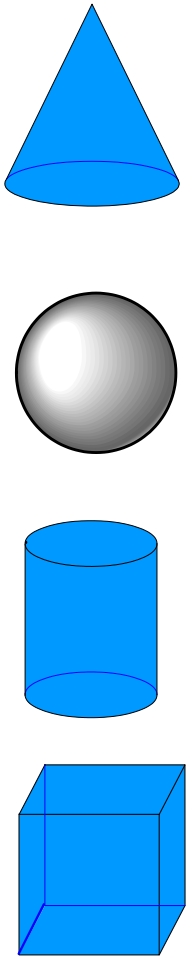
① set volume of sphere as a ratio to the volume of the cylinder

② set height of cylinder equal to 2 * radius

$$\frac{\frac{4}{3}\pi r^3}{\pi r^2 2r} = \frac{\frac{4}{3}\pi r^3}{2\pi r^3} = \frac{\frac{4}{3}}{2}$$

$$\frac{4}{3} * \frac{1}{2} = \frac{4}{6} = \frac{2}{3}$$

Volume Ratios



1

2

3

~4

$\frac{\text{actual}}{\frac{12}{\pi}} \sim 3.8$