SPHERE SURPRISES

SPHERE VOLUME
A cylinder, a sphere and a cone are identical in height and width. Do their volumes have any sort of special relationship?

Answer
The volume of the cylinder is exactly equal to the volume of the sphere plus the volume of the cone. Archimedes considered this finding one of his greatest triumphs.
SPHERE SURFACE AREA
A sphere fits exactly inside a thin-walled cylinder that has a height and diameter equal to the diameter of the sphere.
Which object has more surface area, the sphere or the cylinder?

Answer
The sphere and the cylinder have the same surface area: $4\pi r^2$. 