

Group members (2 to 4): _____

(1) Use cylindrical coordinates to write the integral expressing the volume of the solid formed by intersecting the cylinder $x^2 + y^2 \leq A^2$ with the unit ball $x^2 + y^2 + z^2 \leq 1$. You can assume that $0 \leq A \leq 1$.

(2) Write the same volume integral in spherical coordinates.

(3) Compute the volume using whichever of the above integral forms seems easiest. (For extra credit: expand your answer to at least 4th order in a power series in A around $A = 0$, and provide a geometric interpretation for the first two nonzero terms.)