1. A quarter-spherical volume defined via $T = \{x^2 + y^2 + z^2 \leq 100, \ x \geq 0, \ z \leq 0\}$ has charge density $f(x,y,z) = 3x\sqrt{x^2 + y^2 + z^2}$ micro-coulombs per cubic meter. Calculate the total charge by evaluating $\iiint\limits_{T} f \, dV$. Do so by changing to spherical coordinates. Don't forget to calculate the Jacobian.