1. (3 pts) Compute \( \int_0^2 \int_0^4 \int_z^2 yze^{x^3} \, dx \, dy \, dz \). Hint: You might need to change the order of the integration.

2. (4 pts) Compute \( \iiint_{S} (x^2 + y^2)^{3/2} \, dv \), where \( S \) is the solid bounded above by the paraboloid \( z = \frac{x^2 + y^2}{2} \), below by the \( xy \)-plane, and laterally by the cylinder \( x^2 + y^2 = 4 \).

3. (4 pts) Use spherical coordinates to compute \( \int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} \frac{dz \, dy \, dx}{1 + x^2 + y^2 + z^2} \).