(1) Sketch the region of integration and change the order of integration for $\int_{1}^{2} \int_{0}^{\ln x} f(x, y) \, dy \, dx$.

(2) Evaluate the integral $\int_{0}^{4} \int_{\sqrt{x}}^{2} \frac{1}{y^3 + 1} \, dy \, dx$. 
(3) Evaluate \( \iiint_{E} 6xy \, dV \) where \( E \) lies under the plane \( z = 1 + x + y \) and above the region in the \( xy \)-plane bounded by the curves \( y = \sqrt{x} \), \( y = 0 \), and \( x = 1 \).

(4) Find the volume of the solid tetrahedron enclosed by the coordinate planes and the plane \( 2x + y + z = 4 \).