1. (4 points) The joint density function for a pair of random variables X and Y is

\[ f(x, y) = \begin{cases} 
4xy & \text{if } 0 \leq x \leq 1, \ 0 \leq y \leq 1, \\
0 & \text{otherwise.}
\end{cases} \]

Find the expected value of X.

2. (5 points) Write down an integral in polar coordinates that yields the surface area of the part of the paraboloid \( z = 9 - x^2 - y^2 \) that lies above the xy-plane. Do not evaluate the integral.
3. (6 points) Evaluate the iterated integral
\[ \int_0^2 \int_0^{2z} \int_0^{\ln x} xe^{-y} \, dy \, dx \, dz. \]