1. (15 points) Use the Lagrange multiplier method to find the minimum and maximum of the function $f(x, y) = e^{x y}$ under the constraint condition $x^2 + y^4 = 3$. Find also the minimum and maximum of $f$ on the region $D = \{(x, y) : x^2 + y^4 \leq 3\}$.

2. (10 points) Let $D = \{(x, y) : 0 \leq x \leq 1, 0 \leq y \leq 1\}$. Compute
\[
\iint_D \frac{1 + x^2}{4 - y^2} dA.
\]

3. (15 points) Reversing the order of integration, compute
\[
\int_0^1 \int_0^{\sqrt{x}} e^{x/y^2} dy dx.
\]