Problem statement Suppose that $f(x,y) = (y - x^2)e^{x^2+y^2}$. Determine which of the integrals I_1, I_2, I_3, and I_4 below is largest, which next largest, etc. Explain carefully how you reached your conclusions. Do not attempt to evaluate the integrals explicitly.

$$I_1 = \int_0^2 \int_0^4 f(x,y)\, dy\, dx \qquad I_2 = \int_0^2 \int_0^{x^2} f(x,y)\, dy\, dx$$

$$I_3 = \int_0^2 \int_{x^2}^4 f(x,y)\, dy\, dx \qquad I_4 = \int_0^2 \int_0^4 |f(x,y)|\, dy\, dx$$

Hint Where is f positive? Where negative?