HW 10

1. Evaluate $Improper \int_{B(0,1)-\{(0,0,0)\}\subset\mathbb{R}^3} \frac{1}{\sqrt{x^2+y^2+z^2}}$ if it exists (or prove that it does not exist).
2. Prove rigorously that $\int_{-\infty}^{\infty} e^{-x^2} dx$ exists as an improper integral and equals $\sqrt{\pi}$.
3. Prove that the improper integral $\int\int_{\mathbb{R}^2} e^{-(2x^2+2y^2+2xy)}$ exists and calculate it.