Math 53 - Multivariable Calculus

Quiz # 8

March 16th, 2012

Exercise 1. *Use a double integral to find the area of the region which is ONE loop of the rose $r = \cos(3\theta)$.*

Exercise 2. *Consider the integral $\int_0^1 \int_y^1 \int_0^y dz\ dx\ dy$, figure out the limits for $\int \int \int dy\ dz\ dx$ and $\int \int \int dx\ dy\ dz$.*

Exercise 3. *Find the volume of the solid that lies within both the cylinder $x^2 + y^2 = 1$ and the sphere $x^2 + y^2 + z^2 = 4$.*

Exercise 4 (Bonus 2pt.). *Evaluate $I = \int_{-\infty}^{\infty} e^{-x^2} dx$. (Hint, square I and then convert to polar coordinates.)*