Math 214 Hwk 9

Problem 1. *Let I_z denote the moment of inertia about the z-axis. First show that the uniform ellipse*

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

of mass M has the moment

$$I_z = \frac{M}{4}(a^2 + b^2).$$

Then find the moment I_z for the uniform ellipse

$$\frac{(x-\alpha)^2}{a^2} + \frac{(y-\beta)^2}{b^2} = 1.$$

of mass M

Problem 2. *Find the moment of inertia for a uniform solid ball of mass M, where the axis of rotation goes through the center of mass.*

Problem 3. *Use the change of variables to evaluate the double integral*

$$\iint_R 48xy \, dxdy,$$

where

$$x = \frac{1}{2}(u+v) \qquad y = \frac{1}{2}(u-v),$$

and R is the square with vertices $(0,0), (1,1), (2,0), (1,-1)$.