Math 241 X8 **Name(s):**

Homework 9 supplement

This is a written homework supplement to the homework for Unit 9: 2D Transformations.

(1) Consider a metal plate in the shape of the triangle with vertices $(1, 0)$, $(0, 3)$, and $(2, 4)$, with density at each point (x, y) given by y kg/m^2. Compute its mass.

(2) Compute the integral $\iint_R x^2\,dA$, where R is the region bounded by the ellipse $4x^2 + y^2 = 1$, by the following method[1]:

(a) Transform the integral into one over the unit disk by an appropriate linear transformation.

(b) Compute the new integral using polar coordinates.

[1] In Mathematica this is easy to do in one transformation; by hand it's easier to do in two steps, since you already have memorized the Jacobian for the polar transform.