Problem Set for section 16.2

Dr. Holmes

March 3, 2006

The recommended problems from the book are 1-4, 9-12, 31-34 (you might also find 35, 36 on moments of inertia to be of interest).

1. \[ \int_C x + y \, ds \]
   when \( C \) is the upper half of the semicircle of radius 3 centered at the origin.

2. \[ \int_C x^2 + y^2 + z^2 \, ds \]
   when \( C \) is the straight line path from \((1,1,1)\) to \((1,2,3)\).

3. Find the mass and the center of mass of a wire following the helix \( \langle \cos(t), \sin(t), t \rangle \) from \((1,0,0)\) to \((\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}, \frac{\pi}{4})\) if the density of the wire at a point is equal to the square of the distance of the point from the origin.