Physics 4321/7305 Professor Scalise
Homework Assignment #6 Due: 2 October 2007

4321

1. Show that $\dot{\hat{e_\theta}} = -\hat{e_r}\dot{\theta}$.
2. Find the radial and tangential components of the acceleration in terms of the 2-dimensional polar variables and their time derivatives. Remember that the unit vectors also change in time.
3. Derive the scale factors for cylindrical polar 3-dimensional coordinates. Show all the work.
4. Find the volume mass density for a ring of mass m and radius R centered on the origin and lying in the x-y plane, in cylindrical polar coordinates.

7305

1. Find the radial and tangential components of the jerk (the time derivative of the acceleration) in terms of the 2-dimensional polar variables and their time derivatives. Remember that the unit vectors also change in time.
2. Find the volume mass density for a uniform solid disk of mass m and radius R centered on the origin and lying in the x-y plane, in cylindrical polar coordinates.
3. And in spherical polar coordinates.

Bonus: Solve as much of the other class' assignment as you can.