Physics 3344
Homework 2 29 Jan 2008
Due Tues, Feb 5

1. Read Marion section 2.4 (Equation of Motion for a Particle)

   True/False: I read this material.

2. Marion (4th ed) Ch 1, Problems 10, 24, 25, 31

   For 31, evaluate using the gradient in cartesian coordinates.

3. After solving for **a** in problem 25

   (a) use your result to give the magnitude and direction of **a** for the special case of uniform circular motion (*i.e.* constant radius and speed). Do this separately for motion in the 1-2 plane (*i.e.* the $x - y$ plane with $z = 0$), and the 1-3 plane.

   (b) For the same two planes, show that when the speed changes but with radius still constant, **a** acquires a second component while retaining the previous one. Give its magnitude and direction.

   The results should be familiar from intro mechanics. It's probably simplest to express your results in terms of angular velocity ω and angular acceleration α. Also, use spherical coordinates throughout; don't convert anything back into cartesian coordinates. (Prob 25 takes some work, but this part should be simple.)