Phys 410 – Homework #4

All problems from Taylor.

1) 7.14 (3 pts)
2) 7.20 (3 pts)
3) 7.23 (3 pts)
4) 7.31 (a and b). (6 pts)
   a) To get the kinetic energy correct, write down the (x,y) position vector of the pendulum in terms of x and ϕ, then take the derivative to get the velocity vector.
   b) When approximating for part (b), keep all terms linear in ϕ, but drop those that are quadratic in ϕ and ϕ-dot.
5) 7.34 (a and b) (6 pts)
6) 7.41 (3 pts). Note that there is gravitational potential energy (*mgz*) in this problem.
7) 7.43 (a, b, c, and d). (12 pts)
   a) When writing down the gravitational potential energy, keep in mind that both (m) and (M) contribute. For sketching the potential in part (b), use the numerical values given in part (c).
8) 7.44 (a, and b). (6 pts) This is a continuation of problem 7.29 from Homework #3.