Problem Set 5

Physics 41

Due Date: Friday, October 2, 2009

1. Chapter 6: Problems 47, 61, 72, 73;

2. Chapter 7: Problems 58, 70, 94, 101, 104, 106.

3. Find the potential function for the following force fields:

   (a) $\mathbf{F} = ky^2\mathbf{i} + (2kxy - \alpha z)\mathbf{j} - \alpha y\mathbf{k}$

   (b) $\mathbf{F} = k_1 x\mathbf{i} + k_2 y\mathbf{j} + k_3 z\mathbf{k}$

4. Find the force experienced by the particle due to the potential function

$$U(x, y, z) = \frac{\alpha}{(\sqrt{x^2 + y^2 + z^2})}$$

   where α is a positive constant. What is the direction of this force at some point x, y, z.