

## Physics 2300: Problem Set #7

These problems are due at the end of the day on Wednesday, October 10. Remember to write a concise problem statement, and to give just a word or two as to where your equations are coming from.

1. Given  $\vec{F} = (2ky)\hat{x} + (-kx)\hat{y}$ , compute the work as an object moves from the origin  $(0, 0)$  to  $(\ell, h)$ 
  - (a) along a straight line path  $\vec{r}(s) = (s\ell)\hat{x} + (sh)\hat{y}$  where  $s \in (0, 1)$ .
  - (b) along the parabolic path  $\vec{r}(s) = (s\ell)\hat{x} + (s^2h)\hat{y}$  where again  $s \in (0, 1)$ .
  - (c) Compute the work along the same two paths for the case  $\vec{F} = (2kx)\hat{x} + (-ky)\hat{y}$
2. Morin 3.70 (Stopping on a cone)
3. Morin 5.46 (Spring and hoop)
4. Morin 5.48 (Over the pipe)
5. Morin 5.63 (Speedy travel)
6. Morin 5.68 (Maximum  $p$  and  $E$  of a rocket)
7. Morin 5.73 (One dimensional collision)
8. (BONUS) Morin 5.53 (Leaving the hemisphere)