Physics CS 31 **Fall 2014**

Set #8 - for Wd Dec. 3

Read HR&K	Ch. 6, Ch. 7, Ch. 13 - Sects. 13.1, 13.2, 13.3, 13.4.
Read K&K	Ch. 4, Ch. 5 - Sects. 5.1 - 5.8, Note 5.2
Read Feynman Vol. 1	Ch. 10, Ch. 14

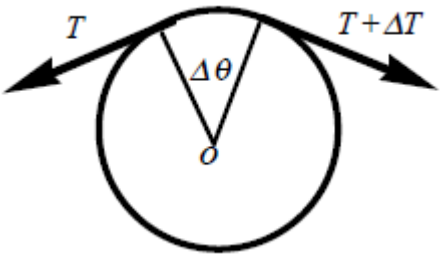
From HR&K:

Ch. 12 Problems 3, 5, 7, 9, 10, 12.
Ch. 13 Problem 6.
Ch. 6 Problem 3.
Ch. 7 Exercise 20. Problems 2, 6.

From K&K:

Ch. 5 Problems 5.2, 5.6.

1. a) A cord moving at low speed v rubs against a round post and deviates from a straight line by a small angle $\Delta\theta$. If the tension on one side of the post is $T + \Delta T$ and on the other side is T, what is the difference ΔT introduced by friction?
b) Find the ratio of tensions at the two ends of a cord wrapped around a circular post a finite angle α and pulled so as to slip.



2. The potential energy of a point particle is $U(x) = -x^2 + 2x^4$.
a) Find the force associated with this potential energy. b) Sketch $U(x)$ showing its essential features. c) Discuss the motion for the case $E > 0$. Find v at $x = 0$, where E is the total energy of the particle. d) Discuss the motion for $E < 0$.

3. a) Consider the force field $\vec{F} = -Ar^3\hat{r}$ where A is a constant and $\hat{r}$ is the radial unit vector. Is this force conservative? If so, find the potential energy function associated with this force. b) Repeat for the force $\vec{F} = B(y^2\hat{i} - x^2\hat{j})$ where B is a constant. Find the work done by $\vec{F}$ along the path shown below.