Physics CS 31 **Fall 2014**

Set #7 - for Wd Nov. 19

Read HR&K	Ch. 11 - Sects. 11.1 - 11.6, Ch. 12 - Sects. 12.1 - 12.3, 12.5 - 12.6
Read K&K	Ch. 3 (p. 89-106), Ch. 5 - Sects. 5.1 - 5.6, Note 5.2
Read Feynman Vol. 1	Ch. 13, Ch. 14

From HR&K:

Ch. 11 Exercise 6, 31. Problems 11, 14.

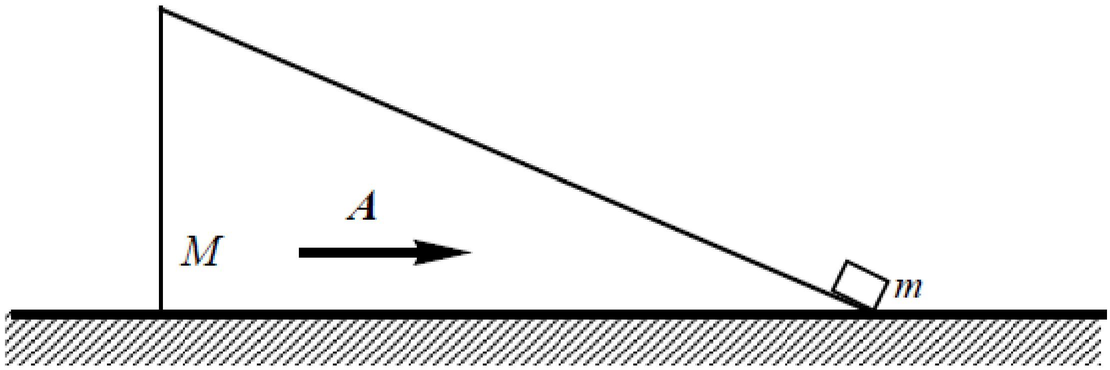
Ch. 12 Exercises 7, 18. Problems 4.

From K&K:

Ch. 3 Problems 3.8, 3.23, 3.25.

Ch. 2 **Extra Credit 2.13**

1. Find the time it takes the mass m to reach the top of the wedge of length l (slant), wedge angle θ and mass M, when a horizontal acceleration A is applied to the wedge as shown below. Neglect friction with any surface. What is the minimum acceleration A needed?



2. The engine of a racing car of mass m delivers a constant power P at full throttle. Assuming that friction is proportional to the velocity, find an expression for $v(t)$ if the car accelerates from a standing start at full throttle. Does your solution behave correctly as $t \to \infty$?

3. a) Evaluate the work done by the force $\vec{F} = (x^3 + y^3)\hat{\imath} - 2xzy^2\hat{\jmath} + (x + y + z)\hat{k}$ along the path defined by $y = x^2$, $z = 2$ and $0 \le x \le 1$.
b) Repeat for the force $\vec{F} = \theta\hat{\theta}$ along a counterclockwise circular path of unit radius centered at the origin.

4. In the system shown below the ropes and the pulleys are massless. There is no friction anywhere. Find the acceleration of each block.