- Last Lecture
  - Circular Motion with Gravity
- Today
  - Conclusion of F=ma and start of Work/Energy
- Important Concepts
  - Don't forget centripetal acceleration.
  - Think carefully about *all* of the components of the acceleration.
  - Pay attention to physical constraints (for example, string tension or normal force going negative).
  - Work and Energy concepts can make some problems with complicated dynamics easier to solve.

Important Reminders

- Pset # 5 due tomorrow at 10am.
- Next Mastering Physics deadline is next Monday.

- Slightly modified version of the syllabus is posted.

- Details of mid-term evaluation will be distributed in class tomorrow.
- 8.01L student advisory board cancelled due to lack of interest.

Work done by a Force

- Not a vector quantity (but vector concepts needed to calculate its value).
- Depends on both the direction of the force and the direction of the motion.
- Four ways of saying the same thing
  - Force times component of motion along the force.
  - Distance times the component of force along the motion.
  - $W=\Sigma|F||d|\cos(\theta)$ where θ is the angle between F and d.
  - $W = \int \vec{F} \cdot d\vec{s}$ where the "s" vector is along the path

Important Concepts

- Energy is never created or destroyed, only moved from one form to another or one object to another.
- Kinetic energy (the energy associated with motion) is one form of energy.
- Sometimes the effect of a given force on moving around energy is difficult to quantify or the effect is to move energy into or out of an object not considered part of the system.
  - For example, friction creates heat.
  - In such cases, it is often convenient to use the work done by a force and say that work is change in energy.