Physics 151 Reading Assignment for July 1
Sections 6.3 through 6.5, 9.1, and 9.2

Please notice that this file is two pages long.

6.3 Circular Dynamics

- The centripetal acceleration - inward acceleration necessary for circular motion.
- Don't put any new forces on your free-body diagrams.

6.4 Apparent Forces in Circular Motion

- There is no such thing as an outward *centrifugal* force. It's all an illusion caused by the object's inertia trying to make it go in a straight line.
- Circular motion is another situation where the normal force acting on an object doesn't have to be equal to its weight. Remember that "apparent weight" is just the normal force.

6.5 Circular Orbits and Weightlessness

- The earth is not flat, so if a projectile goes fast enough, it can follow the earth's curvature and become a satellite.
- There is gravity in outer space! In orbit, objects have zero apparent weight.

9.1 Impulse

- Impulse - $\overrightarrow{\mathbf{J}}$ (All the obvious letters were taken)
- For a constant force, $\overrightarrow{\mathbf{F}}_c$ impulse is force multiplied by how long the force is exerted, $\overrightarrow{\mathbf{J}} = \overrightarrow{\mathbf{F}}_c \Delta t$
- We often just think about the average force acting on an object, $\overrightarrow{\mathbf{F}}_{av}$, since that's guaranteed to be a constant force
- For changing forces, we have to make a graph of force versus time and find the area

9.2 Momentum and the Impulse-Momentum Theorem

- Rewriting Newton's Second Law gives $\overrightarrow{\mathbf{F}}_{av} = \dfrac{m\overrightarrow{\mathbf{v}}_f - m\overrightarrow{\mathbf{v}}_i}{\Delta t}$
- Momentum, $\overrightarrow{\mathbf{p}} = m\overrightarrow{\mathbf{v}}$ (All the obvious letters were taken). Unit $= kg \cdot m/s$
- Second Law: $\overrightarrow{\mathbf{F}}_{av} = \dfrac{\Delta\overrightarrow{\mathbf{p}}}{\Delta t}$
- Impulse-Momentum Theorem: Impulse = change in momentum. $\overrightarrow{\mathbf{J}} = \Delta\overrightarrow{\mathbf{p}}$
- Hard to show but the impulse-momentum theorem holds not only for constant forces but *also for changing forces*!!
- For a collection of particles, we find the total momentum $\overrightarrow{\mathbf{P}}$ (capital P) by doing vector addition