Physics 151 Reading Assignment for October 5 Sections 6.1-6.2 and 3.8

Please notice that this file is two pages long.

6.1 - Uniform Circular Motion

- Uniform circular motion = going around a circle with constant speed.
- To locate an object going around a circle, it is easiest to give the angle = angular position.
- For various reasons, we introduce two more angles units here: radians and revolutions.
- When angle is in radians, arclength $s = r\theta$, which leads to $360^\circ = 2\pi\, rad$.
- $1\, rev$ = once around a circle, so $1\, rev = 360^\circ = 2\pi\, rad$.
- Angular displacement is simply $\Delta\theta = \theta_f - \theta_i$.
- Angular velocity $\omega = \dfrac{\Delta\theta}{\Delta t}$.
- The official unit of ω is rad/s though in the U.S. we like the $rev/min = RPM$.
- Angular-position and Angular-velocity graphs = probably won't have time to do this in class, so read on your own.

6.2 - Speed, Velocity, and Acceleration in Uniform Circular Motion

- We now have to distinguish between angular velocity ω and linear velocity v. (Calling v the linear velocity isn't the best name, but nobody's come up with anything better!)
- $v = \omega r$ gives the correct answer only when ω is in rad/s units.
- Velocity and Acceleration - this is where you'll probably want to go back and read section 3.8. It gives the derivation of the centripetal acceleration, $a = \dfrac{v^2}{r} = \omega^2 r$.