Physics 151 Reading Assignment for June 26 Sections 6.1, 3.8, and 6.2

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 angle 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.

3.8 Motion in Two Dimensions: Circular Motion

- Many of the quantities we'll need in chapter 6 were introduced here.
- Period, T - Time for one revolution.

- Frequency, f - How frequently the object goes around the circle. Period and frequency are inversely related.
- Centripetal Acceleration - Acceleration towards the center of the circle necessary for circular motion.

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 why I had you go back and read section 3.8. It gives the derivation of the centripetal acceleration, $a = \dfrac{v^2}{r} = \omega^2 r$.