Lesson 6: The Milky Way Galaxy

Reading Assignment

- Chapter 23.1: Our Parent Galaxy
- Chapter 23.2: Measuring the Milky Way
  - Discovery 23-1: Early "Computers"
- Chapter 23.3: Galactic Structure
- Chapter 23.4: The Formation of the Milky Way
- Chapter 23.5: Galactic Spiral Arms
  - Discovery 23-1: Density Waves
- Chapter 23.6: The Mass of the Milky Way

Math Notes

- Galactic Mass
  - Read Chapter 23.6.
  - v_c = speed of object in circular orbit around Galaxy
  - $M_{<r}$ = mass of Galaxy within radius r
  - r = radius of orbit
  - G = Newton's gravitational constant
  - Recall the equation for the speed of an object in a circular orbit from Lesson 2:
    - $v_c = (GM_{<r} / r)^{1/2}$
    - Note: The gravitational effects of the mass exterior to the object's orbit cancel out and consequently do not affect the speed at which the object orbits. Only mass interior to the object's orbit matters.
  - Solving for $M_{<r}$ yields:
    - $\mathbf{M_{<r} = rv_c^2 / G}$
  - Since the Galactic rotation curve is approximately flat, v_c is approximately the same for all radii. **In this case, $M_{<r}$ is proportional to r.**

Homework 6

Download Homework 6 from WebAssign. Feel free to work on these questions together. Then submit your answers to WebAssign individually. Please do not wait until the last minute to submit your answers and please confirm that WebAssign actually received all of your answers before logging off.