

Astronomy Lab (or, “Why You’re Getting 4 Credits instead of 3 Credits in This Course”)

Using Newton’s Version of Kepler’s Third Law to Determine the Mass of a Black Hole

Astronomers discover a neutron star orbiting a black hole.

It has an orbital period of 56 Earth years, and an average orbital radius of 7,500 million kilometers.

Using Newton’s version of Kepler’s Third Law, determine the mass of the black hole, stated in terms of Solar Masses (m_{\odot}).

Important points to remember:

1. To use Newton’s equation(s), you have to use **correct standard units** (seconds, meters)
2. 1 Solar Mass ($1 m_{\odot}$) = 2.0×10^{30} Kilograms
3. Use Scientific Notation as you work through this – the numbers are too damned big, and you’re guaranteed to choke if you try to use standard notation!
4. Feel free to ask questions!

Don’t panic. This is doable ***IF*** you follow the steps that I’ve shown you. Notice, however, that I did not say that it was easy. It’s not supposed to be. This is college-level science, and it’s why this course in particular is accepted for full transfer to institutions such as Cornell and Orono.

Take your time, **show your work**, ***be neat***, take a picture of your work and email it to me.

(This would make a dandy final exam question (hint, hint!))