Problem Set #3

Due Tuesday, March 17 by 5pm to Dickinson 104

Unless otherwise indicated, all problems come from "The Cosmic Perspective," 8e

*Note that this problem set has problems both from Chapter **5** and from Chapter **15**. Make sure you're paying attention to the problem numbers here!*

1. Problem 5.43 *Energy Level Transitions*
2. Astronomers claim that objects throughout the universe are made of the same chemical elements that exist here on Earth. Given that most of these objects are so distant that we can never hope to visit them, why are astronomers so confident that these objects are made from the same set of chemical elements, rather than some completely different type of materials?
3. Problem 15.50 *The Luminosity of Alpha Centauri A*
4. Problem 15.51 *More Practice with the Inverse Square Law of Light (Note: Part (d) of this problem has a typo. The star's apparent brightness is* $9 \times 10^{-15}\text{W/m}^2$*)*
5. Problem 15.52 *Parallax and Distance*
6. Star A has a luminosity of 5 $L_\odot$ and a parallax angle of 0.01". Star B has twice the luminosity and half the parallax angle. Which star appears brighter? By what factor (i.e. how many times)? Show your work.