

Often the biggest challenge to doing homework is to figure out the detailed steps. A more important task is to think about what you learned. After doing a problem, identify the big ideas and the details. If you cannot identify what you learned immediately after doing a problem, you will certainly not be able to recall the ideas on a test.

1. In a few years, many of you will be teaching. A student asks you a question. You will have to do some research. A useful site is <http://www.webelements.com/>. To find out about isotopes of platinum, for example, search for “platinum isotopes.”
 - a. (2 pts.) The student asks, “Where was the platinum nucleus in my nose ring made?” (Interpret “where” to be a plausible environment.)
 - b. (5 pts.) The student asks, “What was it before it was platinum?” (Interpret “platinum” to mean ^{195}Pt .)
 - c. (3 pts.) You ask the student to write an essay on how the platinum nucleus got from that environment into the nose ring. What are essential elements of the essay?
2. **Mizar, the first binary star discovered from the spectrum.** Even though Mizar appears to be a single star, Pickering’s spectrum showed it to be a binary star. You will need to refer to the spectrum shown in class on Oct. 28th. The speed of light is 3×10^5 km/s.
 - a. (3 pts.) What are the big ideas needed to answer this question?
 - b. (2 pts.) Look at the drawing of the orbit of the binary star. Be certain to note the location of the earth. Why is there only a single spectral line on 1 and 23 October and two spectral lines on other days? The reason is not that one star blocks the light of the other star.
 - c. (2 pts.) Why is the $\text{H}\beta$ line of hydrogen not at its laboratory wavelength even on 1 October?
 - d. (not graded) Find the speed of the center of the binary star system.
 - e. (1 pt.) Find the orbital speed of one of the stars.