Physics 3180 (Schroeder)
Spring 2026

Recommended Problems for Week 8

1. Problem 4.18, page 133. Many of the problems in Sections 4.3 and 4.4 involve technical details that we won't take the time to master in this course (though none are especially difficult so I'd encourage you to try them if they interest you). But this derivation should reinforce the meaning of "efficiency" and is also a good review of the properties of adiabatic ideal-gas compression and expansion discussed in Section 1.5.

2. Problem 4.36, page 148. For this problem you'll need to remember some facts about momentum from your earlier coursework. You're just making a rough estimate, so don't write down a lot of insignificant digits.

3. Problem 5.1, page 152. Lots of arithmetic here!

4. Problem 5.2, page 152. This problem will give you a bit of practice working with thermodynamic data tables.

5. Problem 5.6, page 156. An important application to biochemistry!

6. Problem 5.8, page 158. Some short but important derivations.

7. Problem 5.11, page 158. This is a practical application of the abstract relations of this subsection. The calculations aren't difficult, but there's a conceptual trap because we're talking simultaneously about differences between one temperature and another, and changes as a reaction takes place. Don't use the symbol Δ for both!

8. Problem 5.20, page 163. A quick exercise to get used to the idea that at constant temperature, the free energy tends to decrease.