Note These problems are **not to be handed in.** They are here merely to provide practice with the topics from the last couple days of class that have not occurred on other problem sets. You should work through these when you review for the exam, but you do not need to submit them. I will post solutions before the end of reading period.

1. Textbook problem 2.8.1 # 3 (p. 225).
2. Textbook problem 2.8.1 # 6 (p. 226) (we worked through this argument somewhat informally in class; try to write it out carefully).
3. This problem is about Stirling cycle numbers. The text uses the notation $\begin{bmatrix} n \\ k \end{bmatrix}$ for the Stirling numbers, which we follow below.
   (a) Using a combinatorial argument, prove that $\begin{bmatrix} n \\ n \end{bmatrix} = 1$ for all $n \in \mathbb{N}$.
   (b) Using Table 2.5 on p. 230 of HHM, conjecture an exact formula for $\begin{bmatrix} n \\ n-1 \end{bmatrix}$, where $n \geq 2$.
   (c) Prove your conjecture from part (b)
4. How many ways are there to put ten different dogs into pens, if each pen can hold any number of dogs, and every pen is exactly the same?