1. 7.8 in text (prove that CONNECTED is in P, by analyzing a given algorithm).

2. 7.11 in text (ISO is in NP).
   As a side note, we do not know whether ISO is in P, nor whether ISO is NP-Complete. It is often believed that it is neither, namely that ISO is a hard problem (not in P), but not “the hardest problem” (not NP-Complete).\(^1\)

3. Read problem 7.29 in text (a scheduling problem for final exams). Formulate this problem as a language, and show that this language is in NP. (That is, solve problem 7.29, except you don’t have to show that the problem is NP-hard, just that it is in NP).

4. (a) Show that P is closed under complement.
   (b) Show that NP is closed under concatenation.

5. Let \( L \) be some non-trivial language that is in P (e.g., \( L=\)CONNECTED, \( L=\)COMPOSITES, \( L = a^* \), etc). Prove that \( L \) is NP-Complete if and only if \( P=NP \).

\(^1\)Of course, if \( P=NP \), this belief is wrong on both counts.