Exercises for chapter:

1. Finish this argument. Show that, if we can solve the optimization problem, we can solve the decision problem. Now, supposing we can solve the decision problem, how does that give a solution of the optimization problem? Assume that the outcome of the optimization problem is an integer quantity. Do you have to make other assumptions; discuss? What is the complexity of the one solution method given a certain complexity for the other?
2. Prove that NP is closed under union and intersection. What difficulty is there in showing that it is closed under complement taking?
3. Why is the following algorithm not a linear time solution to the PRIME problem?

   for $i = 0 \ldots \sqrt{n}$:
   if $\mathrm{mod}(n, i) \equiv 0$
   return true