1. What is the definition of a polynomial-time mapping reduction from language to language ?
2. What is the definition of notation ?
3. Suppose that P and . Can you conclude that P?
4. Suppose that P and . Can you conclude that P?
5. Suppose that P = NP. Show that, for every NP,
6. Give an example of a decision problem that is not in NP. Justify your answer.
7. SATPL is the following decision problem.

**Input.** A propositional formula ϕ.

**Question.** Does there exist a truth-value assignment that makes ϕ true? That is, is it possible to choose values for the propositional variables in ϕ so that ϕ is true?

Show that SATPL DOUBLE-SATPL by giving a polynomial-time mapping reduction from SATPL to DOUBLE-SATPL. (DOUBLE-SATPL is defined in exercise set 0911.) (**Hint.** Add an extra variable.)