

Handout 8: Homework 4

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This assignment is due by the start of lecture on November 11.

Try to solve all five problems, but turn in solutions to only four of them of your choice. If you turn in five solutions, we will grade four of them of our choice.

1. **(25 points)** (Sipser 7.21) [Double-SAT is NP-complete]
2. **(25 points)** (Sipser 7.30) [Minesweeper is NP-complete]
3. **(25 points)** (Sipser 7.34) [Dominating-Set is NP-complete]
4. **(25 points)** (Sipser 9.12) [Error in “proof” that $P \neq NP$]
5. **(25 points)** (Sipser 7.37) [Factoring integers in polynomial time if $P=NP$]
(HINT: Make sure you read problem 7.36 first. You need to think of a language in NP such that it is possible to factor a number in polynomial time by calling its decider as a subroutine a polynomial number of times. Remember that the algorithm must be polynomial in the bit-length of the input and not in the value of the input.)