

**Note:** The homework is the same for both sections. It will not be handed in. However, you are *strongly* encouraged to do the homework in order to prepare for the third quiz on **November 27** and the final. The quiz will contain similar problems for those topics we cover in class *before* the quiz. The final will cover the rest of the topics, as well as all those covered this quarter.

- 1) #3.9
- 2) #3.14
- 3) #3.15
- 4) #4.7
- 5) #4.10
- 6) #5.4
- 7) #5.12
- 8) #7.6
- 9) #7.7
- 10) Let

$L = \{\langle M_1, M_2 \rangle \mid M_1 \text{ and } M_2 \text{ are TMs such that, for some input } x, \text{ both } M_1 \text{ and } M_2 \text{ halt on } x\}.$

- (a) Prove that  $L$  is Turing-recognizable.
- (b) Prove that  $L$  is undecidable.