Due Monday, November 6.

- 1. For each of the following, determine if the statement is true or false. Briefly explain your answers.
 - (a) $n^2 \in O(n)$.

(c) $n^3 + \sqrt{2^n} \in O(n^3)$.

(b) $n^2 + 3\log n \in O(n^2\log n)$.

- (d) $2^{2^n} \in O(n^n)$.
- 2. Prove that $\{w \in \{0,1\}^* : w \text{ is a binary number divisible by 5}\}$ can be decided in O(n) time by a TM.

- 3. Suppose that $L, K \subset \{0,1\}^*$ are languages in class P . Prove the following are also in class P .
 - (a) The complement of L.

(b) The union $L \cup K$.