CS311, Fall 2003
Homework 6. Due Tuesday, October 28, 2003

Problems 1 through 6 For each question on the exam which you missed (including 2(b) and 3), write out the correct answer. Your answer will be graded for exactness. You do not need to do this for questions for which you received 3 or fewer points off. Please do not work with others this time. If you have a question, ask a TA or Dr. Booth.

Problem 7 For the following recurrence relation:
\[
    t(n) = t(n/2) + n
\]
\[
    t(1) = 1
\]
Assume that \( n \) is a power of 2.
(a) Show the values of \( t(n) \) for \( n = 1, 2, 4, 8, 16 \). Show your work.
(b) Guess a solution for \( t(n) \) (for \( n \) a power of 2) by inspection.
(c) Guess a solution for \( t(n) \) by "working backwards", as done in class.

Problem 8 Consider the following recurrence relation:
\[
    t(n) = 3t(n - 1)
\]
\[
    t(1) = 1
\]
Prove by induction that \( t(n) = 3^n - 1 \) for all \( n \geq 1 \).