CS 381	**Introduction to Theory of Computing**	Summer 2002
Homework 3		Due: Wed, June 12, 2002

You must justify (prove or explain) every statement you make.

1. Kozen, p. 303, number 3. See the hints (pp. 351-352) and solution (pp. 358-361) for problem 26 of page 322. Your solution should follow this outline fairly closely.

2. Kozen, p. 305, number 3

3. For the first (left) automata on page 305 of Kozen, give an equivalent regular expression using the recursive approach of lecture 9. Use the automata as given (not minimized). In your recursion, first remove state 4, then state 3. Express your answer in terms of $\beta = ba$, $\gamma = a^*b$, and $\delta = a + bba^*b$. For your final answer, just combine the recursive elements without simplifying.

4. For each of the following languages, describe the equivalence class of $\equiv_R$ and determine the number of equivalence classes.

i) $R = \{w \in \{a, b\}^* \mid w \text{ ends in } ab\}$
ii) $R = \{a^n b^m \mid m \geq n\}$
iii) $R = L((aa^*b + ba^*b)^*ba^*)$

5. Kozen, page 306, number 2.