Due at the start of class Tuesday, October 25, 2005.

**Problem 1.** Do Exercise 3.13 (page 112) in Kimber and Smith.

**Problem 2.** Do Exercise 3.37 (page 116) in Kimber and Smith.

**Problem 3.** Show that the following languages are not context free.

a.  
\[ \{a^p \mid p \text{ is a prime number} \} \]

b.  
\[ \{a^{n^2} \mid n \geq 0 \} \]

c.  
\[ \{www \mid w \in \{a,b\}^* \} \]

d.  
\[ \{w \in \{a,b,c\}^* \mid w \text{ has the same number of } a\text{'s, } b\text{'s, and } c\text{'s} \} \]

e.  
\[ \{w \in \{a,b,c\}^* \mid w \text{ has more } a\text{'s than } b\text{'s and more } b\text{'s than } c\text{'s} \} \]