Name: ____________________________

Math 166 - Theory of Computability - Winter 1999

Quiz #4 — February 4

1. Indicate whether true or false.

____(a) The expressions $(a^*b^*)^*$ and $(a \cup b)^*$ represent the same language.

____(b) For all L, ϵ is in L^*.

____(c) For all L, $L \circ L \subseteq L^*$.

2. Give regular expressions which represent the following languages over $\Sigma = \{a, b\}$.

   (a) $L_1 = \{a^{2i} : i \in \mathbb{N}\}$.

   (b) $L_2 = \{w : w \text{ contains exactly two } a\text{'s}\}$.

   (c) $L_3 = \{w : w \text{ contains an even number of } a\text{'s}\}$.

   (d) $L_4 = \{w : w \text{ contains an odd number of } a\text{'s}\}$.

3. Convert the following DFA into a regular expression. To get full credit, you should use the method from the lecture and textbook (or should make it clear you are following an alternative <u>general</u> method).