Name: _____

Directions: Show all work. No credit for answers without work.

1. Let $\Sigma = \{a, b\}$. Define

$$A_1 = \{w \mid w \text{ has even length}\}$$
$$A_2 = \{w \mid |w| \geq 1 \text{ and } w \text{ starts and ends with the same symbol}\}.$$

Give Deterministic Finite Automata (DFA's) that compute the following languages.

(a) **[3 points]** A_1

(b) **[4 points]** A_2

2. **[3 points]** With A_1 and A_2 as in problem (1), give a DFA for $A_1 \cap A_2$.