

Name: _____

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

1. Let $\Sigma = \{a, b, c\}$. We define the following languages.

$$A = \{w \in \Sigma^* : w \text{ ends with a b}\}$$

$$B = \{w \in \Sigma^* : \text{every } a \text{ in } w \text{ appears before every } c\}$$

- (a) [**2 points**] Construct a DFA for A .

- (b) [**2 points**] Construct a DFA for B

- (c) [**3 points**] Construct a DFA for $A \triangle B$. (Recall that $A \triangle B = (A - B) \cup (B - A)$.)

2. [3 points] Let $\Sigma = \{0, 1\}$ and let $A = \{w \in \Sigma^* : \text{the number of zeros and ones in } w \text{ is not equal}\}$. Show that A is not a regular language. (Your argument should mostly use English sentences.)