1. Suppose \( A \) and \( B \) are recursively enumerable languages such that \( A \cup B = \Sigma^* \). Further, suppose \((A \cap \overline{B}) \cup (A \cap B)\) is decidable. What can you say about \( A \) and \( B \)?

(A) It is possible that neither \( A \) nor \( B \) is decidable.
(B) At least one among \( A \) and \( B \) is decidable.
(C) Both \( A \) and \( B \) are decidable.

2. Let \( L \) be recursively enumerable. Which of the following is true about \( L \)?

(A) If \( L' \subseteq L \) then \( L' \) is recursively enumerable.
(B) If \( L \subseteq L' \) then \( L' \) is recursively enumerable.
(C) \( L \leq_m A_{TM} \), where \( A_{TM} = \{\langle M, w \rangle \mid w \in L(M)\} \)

3. Let \( A \) and \( B \) be any languages such that \( A \leq_m B \). Under what conditions is it the case that \( \overline{A} \leq_m \overline{B} \)?

(A) Only when both \( A \) and \( B \) are decidable.
(B) Only when both \( A \) and \( B \) are recursively enumerable.
(C) Always.

4. Recall that \( A_{TM} = \{\langle M, w \rangle \mid w \in L(M)\} \). Suppose \( A_{TM} \leq_m L \). What can you say about \( L \)?

(A) \( L \) is not decidable but is recursively enumerable.
(B) \( L \) is not decidable but may or may not be recursively enumerable.
(C) \( L \) is not recursively enumerable.
5. Which of the following is a property of recursively enumerable languages?
   - \{M \mid M \text{ accepts 312929 strings}\}.
   - \{M \mid M \text{ has 312929 states}\}.
   - \{M \mid M \text{ has 312929 symbols in tape alphabet}\}.

6. Let \( L = \{M \mid M \text{ is a TM that accepts at most 312929 strings}\} \). Observe that \( L \) is recursively enumerable. What can you say about \( L \)?
   (A) \( L \) is decidable.
   (B) \( L \) is not decidable but is recursively enumerable.
   (C) \( L \) is not recursively enumerable.