Name: _____

1. (1 pt.)
   - **Read all material carefully.**
   - You may refer to your books, papers, and notes during this test.
   - No computer or network access of any kind is allowed (or needed).
   - Write, and draw, carefully. Ambiguous or cryptic answers receive zero credit.
   - Use textbook and classroom conventions for notation, algorithmic options, etc.
   - Ask for clarifications on the above if needed.

   Write your name in the space provided above.

2. (9 pts.) Prove or disprove: For every natural number $n > 3$, there exists a 3-regular graph with n vertices.

3. (10 pts.) Depict an NFA that accepts the language $A \cup B$ where $A = \{\mathtt{a}^{2i} \mid i \geq 0\}$ and $B = \{\mathtt{a}^{3i} \mid i \geq 0\}$. You may assume an alphabet $\{\mathtt{a}\}$. *Explain* briefly why your answer is correct.

4. (15 pts.) Provide a DFA that is equivalent to the automaton of Question 3. You are *not* required to use the mechanical method of conversion, though you may. *Explain* briefly why your answer is correct.