Name:

**Directions:** Show all work. No credit for answers without work. Unless specifically asked for a numerical answer, you may leave your answers in terms of exponentials, factorials, permutation numbers, and binomial coefficients.

- 1. [2 parts, 5 points each] Prove or find a counterexample for the following. Recall that a graph G is *k*-regular if every vertex in G has degree k.
  - (a) If G is a 4-regular graph, then the number of vertices in G is odd.

(b) If G is a 5-regular graph, then the number of vertices in G is even.