Assignment 4

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5pts People study one type of graphs called *random graphs*. (Random graphs were introduced by Paul Erdos, a famous mathematician.) Random graphs can be generated in the following way: Consider a set of n vertices. Placing the links (i.e., edges) randomly between the vertices, where each vertex pair is connected with the same probability p. Such a random graph is represented by G and we say that G is created by a (n, p)-model.

Calculate the expected number of edges in a random graph G with n vertices using the (n, p)-model.

5pts We define a *clique* as a subgraph U of the graph G such that every pair of vertices in U is connected by an edge of G (i.e., for all $i, j \in U$, we have $\{i, j\} \in E$). If U has k vertices, we call it a *k-clique*.

Consider a random graph $G = (V, E)$ created using the (n, p)-model. Calculate the expected number of 3-cliques in a graph G created by a (n, p)-model.