Math 101 Homework

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Complete the following problems. Fully justify each response.

1. Consider a Stochastic Block Model defined as follows.

   - There are k clusters
   - Each cluster contains n/k vertices
   - If two vertices u, v are in the same cluster, then $\mathbb{P}(u \sim v) = p$
   - If two vertices u, v are in different clusters, than $\mathbb{P}(u \sim v) = q$.

   Determine the (expected) clustering coefficient of a vertex in the graph (it is the same for every vertex), and also the clustering coefficient of a vertex restricted to its own class. Feel free to approximate anything you need to (like, for example, replacing the degree of a vertex with its expected degree).

   Write some words comparing these values, and how they relate to each other and to p and q.