Random Geometric Graphs

Instructions:
Let $G_{\lambda,d}$ denote the ensemble of random geometric graphs in $d$-dimensional Euclidean space $\mathbb{R}^d$. (Nodes in $G_{\lambda,d}$ are a Poisson point process with intensity $\lambda$ in $\mathbb{R}^d$, and any two nodes are connected if the distance between them is less than 1.)

- What is the expected size of the connected component to which a random node in $G_{\lambda,1}$ belongs?
- What is the most likely size of the connected component to which a random node in $G_{\lambda,1}$ belongs?
- Find the critical value of $\lambda$ corresponding to the onset of the giant connected component in $G_{\lambda,1}$.
- What is the probability $P_{\lambda,1}(s)$ that a random node in $G_{\lambda,1}$ belongs to a connected component of size $s$?
- Write down a general integral expression for $P_{\lambda,d}(s)$.
- Evaluate $P_{\lambda,2}(s)$ for $s = 1, 2$.

Completed Assignment:
is a LaTeX file with detailed calculations.