1. Consider a network with the degree distribution p_k, meaning that a fraction p_k of the nodes have degree k. Alternatively, p_k is the probability that a randomly selected (uniform at random) node from the network has degree k. Suppose now that we follow one of the links (chosen uniformly at random) to a node at the other end from a randomly selected node. What is the probability that the reached node will have degree k? Let us denote this distribution q_k.

   Explicitly state all the assumptions you make during your calculation of q_k. Discuss potential differences if these assumptions do not hold. Interpret your findings. Identify any interesting or counterintuitive observations.

   For the the second part of your homework, write a small program that computes q_k from a network. Test this computation on a randomly generated network (you can use e.g. `https://networkx.org/` library and its API for graph generators). Compare your experimental results with your theoretical results. Next, find a small network datasets with a real-world network and compute q_k for that empirical network. What observations can you make in this case?