

*\*Social\*Networks\**

*Home Work #3*

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*Due: 08 November 2016*

Q1. [10 ] Exercise #1 In  $G(n, p)$  the probability of a vertex having degree  $k$  is

$$\binom{n}{k} p^k (1-p)^{n-k}.$$

Show by direct calculation that the expected degree is  $np$ . Where is the mode of the binomial distribution? [Mode is the point at which the probability is maximum.] Compute directly the variance of the distribution.

Q2. [5 ] In  $G(n, \frac{1}{n})$  what is the probability that there is a vertex of degree  $\log n$ ? Give an exact formula; also derive simple approximations.