Math 342 —Geometric and negative binomial distributions

Problem 1. Suppose applicants for a job are hired with probability $p = 0.15$ independently from person to person, one at a time as they come in. Unless otherwise stated, use geometric or negative binomial random variables to do the following.

a. Find the probability of each of the following events.

   1. It took exactly 3 applicant until the first person was hired.
   2. It took at least 3 applicants until the first person was hired.
   3. It took exactly 10 applicants until 3 people were hired.
   4. It took at least 10 applicants until 3 people were hired.
   5. It took exactly 15 applicants until 7 people were hired.
   6. It took at least 15 applicants until 7 people were hired.
   7. Repeat parts 4 and 6. using a binomially distributed random variable.

b. Find the expected value of the number of applicants seen until

   1. a hire is made.
   2. 3 hires are made.
   3. 7 hires are made.