

## 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.
- 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.