Question 1  [Section 3.2]. For Exercise 14 on p. 109, assume that instead of \( p(y) = ky \), we have \( p(y) = ky^2 \); that is, the probability that \( y \) forms are required is known to be proportional to \( y^2 \). Answer parts (a), (b), and (c) of Exercise 14 under this assumption.

Question 2  [Section 3.2]. Answer all parts of Exercise 22 on p. 110 under the assumption that the cdf of \( X \) is

\[
F(x) = \begin{cases} 
0 & x < 0 \\
.15 & 0 \leq x < 1 \\
.39 & 1 \leq x < 2 \\
.62 & 2 \leq x < 3 \\
.77 & 3 \leq x < 4 \\
.87 & 4 \leq x < 5 \\
.94 & 5 \leq x < 6 \\
.99 & 6 \leq x < 7 \\
1 & 7 \leq x 
\end{cases}
\]

Question 3  [Section 3.3]. A small drugstore orders copies of a certain magazine for its magazine rack each week. Let \( X \) equal the number of copies of the magazine that could be sold in a randomly selected week (i.e., \( X \) is the demand for the magazine). Suppose \( X \) has the mass function given in Exercise 34 on p. 119.

Suppose that the store owner pays $1.50 for each magazine and sells the magazines for $2.70 each. Any unsold magazines at the end of the week must be recycled and generate no profit. Suppose that the store owner will order \( k \) magazines next week, where \( k \) is some constant.

(a) Express the profit \( P \) as a function of \( k \) and \( X \). Note that \( P \) is a random variable because it is a function of \( X \). (Also note: \( P \) is not simply \( 2.7X - 1.5k \); your answer should involve the expression \( \min\{k, X\} \).)

(b) For each value of \( k \), let \( f(k) \) equal the expected profit. Find \( f(k) \) for \( k = 1, \ldots, 6 \) and express your answer in the form of a table.

(c) How many magazines should the store owner purchase if the goal is to maximize expected profit?

Question 4  [Section 3.3]. In Question 3, calculate \( E(X) \) and \( \text{Var}(X) \). If the drugstore orders 6 magazines each week, find the expectation and variance of the number of magazines that must be recycled.

Question 5  [Section 3.4]. For Exercise 46 on p. 126, find the following values:

(a) \( P(X = 0) \)

(b) \( P(X \leq 3) \)

(c) \( P(X \geq 3) \) (Careful! This isn’t merely 1 minus the answer to part (b).)

(d) \( P(1 \leq X < 3) \)

Question 6  [Section 3.4]. Do Exercise 50 on p. 127.

Question 7  [Section 3.5]. A personnel director will interview 15 job candidates. Suppose that 6 of the candidates have had previous experience. If the personnel director interviews the candidates in random order and 5 interviews are scheduled for the first day, let \( X \) denote the number of first-day interviewees who have had previous experience.

(a) What is the probability that \( x \) of the first-day interviewees have had previous experience? (Note the distinction between \( X \) and \( x \).)

(b) Find the expectation and variance of \( X \).

(c) Suppose that \( Y \) is a binomial \((5, 6/15)\) random variable. How do the expectation and variance of \( Y \) compare to those of \( X \)?