CS 333202: Probability and Statistics HW6 Part II

1. Let A denote the event that the purchaser accepts a lot. Now,

$$\begin{split} P(A) &= P(A \mid lothas4defectives) \frac{3}{10} + P(A \mid lothas1defective) \frac{7}{10} \\ &= \frac{\begin{pmatrix} 4\\0 \end{pmatrix} \begin{pmatrix} 6\\3 \end{pmatrix}}{\begin{pmatrix} 10\\3 \end{pmatrix}} (\frac{3}{10}) + \frac{\begin{pmatrix} 1\\0 \end{pmatrix} \begin{pmatrix} 9\\3 \end{pmatrix}}{\begin{pmatrix} 10\\3 \end{pmatrix}} (\frac{7}{10}) \\ &= \frac{54}{100} \end{split}$$

Hence 46 percent of the lots are rejected.

2. (a)
$$\int_0^\infty c e^{-3x} dx = 1 \Rightarrow c = 3$$

(b) $P(0 < X \le 1/2) = \int_0^{1/2} 3e^{-3x} dx = 1 - e^{-3/2} \approx 0.78$
3. (a) $f(x) = \begin{cases} \frac{32}{x^3} & x \ge 4\\ 0 & x < 4 \end{cases}$
(b) $P(X \le 5) = 1 - \frac{16}{25} = \frac{9}{25}$
 $P(X \ge 6) = \frac{16}{36} = \frac{4}{9}$
 $P(5 \le X \le 7) = [1 - \frac{16}{49}] - [1 - \frac{16}{25}] = 0.313$
 $P(1 \le X < 3.5) = 0 - 0 = 0$