CS 333202: Probability and Statistics
HW6 Part II

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

   $P(A) = P(A \mid lothas4defectives)\frac{3}{10} + P(A \mid lothas1defective)\frac{7}{10}$

   $= \frac{\binom{4}{0}\binom{6}{3}}{\binom{10}{3}}(\frac{3}{10}) + \frac{\binom{1}{0}\binom{9}{3}}{\binom{10}{3}}(\frac{7}{10})$

   $= \frac{54}{100}$

   Hence 46 percent of the lots are rejected.

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

   (b) $P(0 < X \leq 1/2) = \int_0^{1/2} 3e^{-3x}dx = 1 - e^{-3/2} \approx 0.78$

3. (a) $f(x) = \begin{cases} \frac{32}{x^3} & x \geq 4 \\ 0 & x < 4 \end{cases}$

   (b) $P(X \leq 5) = 1 - \frac{16}{25} = \frac{9}{25}$

   $P(X \geq 6) = \frac{16}{36} = \frac{4}{9}$

   $P(5 \leq X \leq 7) = [1 - \frac{16}{49}] - [1 - \frac{16}{25}] = 0.313$

   $P(1 \leq X < 3.5) = 0 - 0 = 0$