Math 423 – Prof. Richard B. Goldstein – Walpole – 8^{th} ed – Chapter 5 Answers

5.9 For $n = 15$ and $p = 0.25$, we have

(a) $P(3 \leq X \leq 6) = P(X \leq 6) - P(X \leq 2) = 0.9434 - 0.2361 = 0.7073.$

(b) $P(X < 4) = P(X \leq 3) = 0.4613.$

(c) $P(X > 5) = 1 - P(X \leq 5) = 1 - 0.8516 = 0.1484.$

5.46 Using the extension of the hypergeometric distribution the probability is

$$\frac{\binom{2}{2}\binom{4}{1}\binom{3}{2}}{\binom{9}{5}} + \frac{\binom{2}{2}\binom{4}{2}\binom{3}{1}}{\binom{9}{5}} + \frac{\binom{2}{2}\binom{4}{3}\binom{3}{0}}{\binom{9}{5}} = \frac{17}{63}.$$

5.54 (a) Using the negative binomial distribution, we get

$$b^*(7; 3, 1/2) = \binom{6}{2}(1/2)^7 = 0.1172.$$

(b) From the geometric distribution, we have $g(4; 1/2) = (1/2)(1/2)^3 = 1/16.$

5.64 $\mu = np = (2000)(0.002) = 4$, so $P(X < 5) = P(X \leq 4) \approx \sum_{x=0}^{4} p(x; 4) = 0.6288.$

5.70 (a) $P(X = 4|\lambda t = 6) = 0.2851 - 0.1512 = 0.1339.$

(b) $P(X \geq 4|\lambda t = 6) = 1 - 0.1512 = 0.8488.$

(c) $P(X \geq 75|\lambda t = 72) = 1 - \sum_{x=0}^{74} p(x; 74) = 0.3773.$