HW8 Solutions
Math 3338-10853: Probability (Fall 2006), Dr. Jiwen He

93.

a. $P(X \le 8) = F(8;5) = .932$

b. $P(X = 8) = F(8;5) - F(7;5) = .065$

c. $P(X \ge 9) = 1 - P(X \le 8) = .068$

d. $P(5 \le X \le 8) = F(8;5) - F(4;5) = .492$

e. $P(5 < X < 8) = F(7;5) - F(5;5) = .867 - .616 = .251$

97. $p = \frac{1}{200}$; n = 1000; $\lambda = np = 5$

a. $P(5 \le X \le 8) = F(8;5) - F(4;5) = .492$

b. $P(X \ge 8) = 1 - P(X \le 7) = 1 - .867 = .133$

99.

a. $\lambda = 8$ when t = 1, so $P(X = 6) = F(6;8) - F(5;8) = .313 - .191 = .122$,
$P(X \ge 6) = 1 - F(5;8) = .809$, and $P(X \ge 10) = 1 - F(9;8) = .283$

b. t = 90 min = 1.5 hours, so $\lambda = 12$; thus the expected number of arrivals is 12 and the SD $= \sqrt{12} = 3.464$

c. t = 2.5 hours implies that $\lambda = 20$; in this case, $P(X \ge 20) = 1 - F(19;20) = .530$ and $P(X \le 10) = F(10;20) = .011$.

104. $E(X) = \sum_{x=0}^{\infty} x \frac{e^{-\lambda}\lambda^x}{x!} = \sum_{x=1}^{\infty} x \frac{e^{-\lambda}\lambda^x}{x!} = \lambda \sum_{x=1}^{\infty} \frac{e^{-\lambda}\lambda^{x-1}}{(x-1)!} = \lambda \sum_{y=0}^{\infty} \frac{e^{-\lambda}\lambda^{y}}{y!} = \lambda$