CHAPTER 3

48.

d. E(X) =0.25(20)=5

52.

d. $\mu = 25(.02) = .5$; $\sigma = \sqrt{npq} = \sqrt{25(.02)(.98)} = \sqrt{.49} = .7$ $\mu + 2\sigma = .5 + 1.4 = 1.9$ So $P(0 \le X \le 1.9 = P(X \le 1) = .911$

64.

c. E(X) = $5\left(\frac{6}{15}\right) = 2$; V(X) = $\left(\frac{15-5}{14}\right) \cdot 5 \cdot \left(\frac{6}{15}\right) \cdot \left(1 - \frac{6}{15}\right) = .857$;

$\sigma = \sqrt{V(X)} = .926$

67.

c. E(X) = $n \cdot \frac{M}{N} = 15 \cdot \frac{10}{20} = 7.5$; V(X) = $\left(\frac{5}{19}\right)(7.5)\left(1 - \frac{10}{20}\right) = .9868$;

$\sigma_x = .9934$

$\mu \pm \sigma = 7.5 \pm .9934 = (6.5066, 8.4934)$, so we want
$P(X = 7) + P(X = 8) = .3483 + .3483 = .6966$

82.

a. $P(X = 4) = F(4;5) - F(3;5) = .440 - .265 = .175$

b. $P(X \ge 4) = 1 - P(X \le 3) = 1 - .265 = .735$

c. Arrivals occur at the rate of 5 per hour, so for a 45 minute period the rate is $\lambda = (5)(.75) = 3.75$, which is also the expected number of arrivals in a 45 minute period.

83.

a. For a two hour period the parameter of the distribution is $\lambda = \alpha t = (4)(2) = 8$, so $P(X = 10) = F(10;8) - F(9;8) = .099$.

b. For a 30 minute period, $\alpha t = (4)(.5) = 2$, so $P(X = 0) = F(0;2) = .135$

c. $E(X) = \alpha t = 2$