

# Chap 5 Probability

1.  $\mu = \sum [x(P(x))] = 5(.05) + 6(.2) + 7(.4) + 8(.1) + 9(.15) + 10(.1) = 7.4$

2. Binomial  $n=10$   $x=3$   $p=\frac{1}{5}=.2$   $P(3) = {}_{10}C_3 (.2)^3 (.8)^7$   
 $P(3) = .201$

3. Poisson: A)  $\lambda=3$   $x=0, 1, 2, 3$  table in back  
.6472

B)  $\mu = \lambda = 3$   $\sigma = \sqrt{3} = 1.7321$

4. Poisson A)  $\lambda = \frac{1}{20,000} = \frac{4}{80,000}$   $\frac{4^2 \lambda^4}{2!} = .1465$   
B)  $\mu = 4$   $\sigma = 2$

5. Multinomial  $\frac{5!}{3! 1! 1!} (.5)^3 (.3)^1 (.2)^1 = .15$

6.  $\mu = \sum (x P(x)) = 3(.15) + 4(.3) + 5(.25) + 6(.18) + 7(.1) + 8(.02) = 4.84$

7. Poisson:  $\lambda = \frac{5}{1000} = \frac{1.25}{250}$  A)  $P(2) + P(3) + \dots$  use table  
~~use table~~ A) .3554 B)  $\mu = 1.25$   $\sigma = 1.118$

8. Poisson:  $\lambda = 4$  A)  $\frac{4^5 e^{-4}}{5!} = .1563$  B)  $\mu = 4$   $\sigma = 2$

9. Binomial: A)  $n=25$   $x=3, 4, 5, \dots$   $p=.02$  or  $1 - (P(0) + P(1) + P(2))$   
use table in book  $1 - .9868 = .0132$

$$\frac{25!}{0!(25)!}$$

$$\begin{aligned} 25C_0 (.02)^0 (.98)^{25} &= .6035 \\ 25C_1 (.02)^1 (.98)^{24} &= .3079 \\ 25C_2 (.02)^2 (.98)^{23} &= .0754 \end{aligned} \left. \vphantom{\begin{aligned} 25C_0 (.02)^0 (.98)^{25} \\ 25C_1 (.02)^1 (.98)^{24} \\ 25C_2 (.02)^2 (.98)^{23} \end{aligned}} \right\} .9868$$

10. A)  $\mu = \sum [x P(x)] = 1(.2) + 2(.3) + 3(.4) + 4(.1) = 2.4$

B)  $P(2) + P(3) + \dots = .3 + .4 + .1 = .8$   $\times 3000 = \$7,200$

11. Poisson:  $\lambda = 3$   $P(6) = \frac{3^6 e^{-3}}{6!} = .0504$