

February, 27

Math 333-002, Fall 2007

Name: \_\_\_\_\_

Student ID: \_\_\_\_\_

I pledge I have not violated the NJIT Honor Code \_\_\_\_\_

Must show all work for full credit!

- 1 A corporate website contains errors on 100 of its 1000 pages. If 40 pages are sampled randomly, without replacement, approximate the probability that at most 2 of the pages has errors in the sample. (10 pts)

Let X: the number of pages with error out of  $n = 40$ .

Note that  $p = 100/1000 = 0.10$ .

Therefore,  $\mu = (40)(0.10) = 4$  and  $\sigma^2 = 4(0.90) = 3.6$ ,  $\sigma = 1.897366596$ .

$P(X \leq 2) = P(X \leq 2.5) = P(Z \leq (2.5-4)/1.897366596) = P(Z \leq -0.79) = 0.214767 \approx 22\%$ .

Using Binomial model:

$$\begin{aligned} P(X \leq 2) &= f(0) + f(1) + f(2) = (0.90)^{40} + (40)(0.10)(0.90)^{39} + \binom{40}{2} (0.10)^2 (0.90)^{38} \\ &= (0.90)^{38} \{0.81 + 3.6 + 7.8\} = (0.90)^{38} \{12.21\} = 0.222808124 = 22.28\% \end{aligned}$$