

Test #2

Please, write clearly and justify all your steps, to get proper credit for your work. This is an open-book, no-calculator test. You are supposed to use the tables from the back of the book.

(1)[4 Pts] Flaws in a certain drapery material appear on the average of one in 200 square feet. If we assume that flaws can be modeled using the Poisson distribution, find:

- (a) the probability of having at most one flaw in 300 square feet of material;
- (b) the probability of having no flaws in 300 square feet of material.

(2)[6 Pts] Electric switches are shipped in packages of 12 items. The probability that an item is defective is 0.15. What is the probability that one package contains:

- (a) at least one defective switch;
- (b) more than one defective switch.
- (c) If the shipper decides to compensate the buyer for the defective switches by paying \$2 for each defective switch, what is the expected compensation amount for each package of 12 items?

(3)[4 Pts] In a box containing 1000 light bulbs, 50 are defective. A sample of size 10 is taken at random and without replacement.

- (a) Set up an expression to compute the probability that there are at least 2 defective bulbs in the sample.
- (b) Use the binomial distribution to compute an approximation of the probability in part (i).

(4)[8 Pts] Let the joint p.d.f. of X and Y , denoted by $f(x, y)$, be given by

		x	
	y	1	2
1		0.3	0.1
2		0.2	0.4

- (a) Calculate the marginal densities. Are X and Y independent?
- (b) Compute the means and variances.
- (c) Set up the computation of the correlation coefficient. Are X and Y positively correlated? negatively correlated? uncorrelated?