

MATH 333A: Probability & Statistics. **Examination #1** (Fall 2006)

October 11, 2006 NJIT

Name:	SSN:	Section #
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→ **Must show all steps for each problem to receive full credit.**

Score	
#1	
# 2	
#3	
#4	
#5	
Total	

I pledge my honor that I have abided by the Honor System. _____

1. The amount of aluminum concentration (ppm) in plastic of certain type was determined for a sample of 26 specimens, resulting in the following data:

30 30 60 63 70 79 87 101 102 115 118 119 119 121 125 140 145 172 182 183 190 191 222 244 291 381

- Find the median of the above data
- Prepare a Stem-and-leaf plot
- Comment on the shape of the distribution.

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2. A company that manufactures video cameras produces a basic model and a deluxe model. Over the past year, 40% of the cameras sold have been the basic model. Of those buying the basic model, 30% purchased an extended warranty, whereas 50% of all deluxe purchasers do so.
 - a. If you learn that a randomly selected purchaser has an extended Warranty, what is the probability that this person purchased a basic model?
 - b. What is the probability that a randomly chosen customer buys an extended warranty?

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3. Consider the following 15 sample observations on *fracture strength*, measured in appropriate units, shown below after rearranging them in increasing order of magnitude.

87	93	96	98	106	114	128	131	142	168	175	188	290	380	455
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- a) Calculate the *average* and the *sample standard deviation* .
- b) Find the sample median, the quartiles
- c) Prepare a boxplot and comment on the features of this plot.

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4. Only 1 in 1000 adults is afflicted with a rare disease for which a diagnostic test is available. The result of the test is “*positive*” if the test finding indicates the presence of the rare disease, otherwise the result of the test is “*negative*”. Based on the past experience, for individuals actually having the disease, the test correctly indicates a positive finding 99% of the time; while among individuals without the disease, the test incorrectly shows a positive result 2% of the time.

- a. If a randomly chosen person is tested and has a positive test result, what is the probability that this person is indeed afflicted with the disease?
- b. What is the probability that a randomly chosen person would have a positive test result?

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5 A company policy requires a safety critical part in an electrical appliance to be checked by two inspectors. Each inspector classifies a part as either *acceptable* or *defective*. A part is declared “acceptable for assembly” if and only if it is found acceptable by both inspectors. The data below shows the results of the examination of 10,000 parts, each of which was examined by both inspectors.

	No. of defective parts found
Inspector A	724
Inspector B	751
Both Inspectors	316

- a. What is the probability that a randomly chosen part will be considered “acceptable for assembly” ?
- b. From the above data, can you conclude that the two inspectors act independently of each other? Justify your answer.

END