

# AMS 310 - Practice Exam for Midterm I

Thursday, March 7, 2005

1. Having endured (and survived) the mental trauma that comes from taking two years of chemistry, a year of physics, and a year of biology, Biff decides to test the medical school waters and sends his MCATs to two colleges, X and Y. Based on how his friends have fared, he estimates that his probability of being accepted at X is 0.7, and at Y is 0.4. He also suspects there is a 75% chance that at least one of his applications will be rejected. What is the probability that he gets at least one acceptance?
2. pg. 143, 4.87.
3. During a power blackout, 100 persons are arrested on suspicion of looting. Each is given a polygraph test. From past experience it is known that the polygraph is 90% reliable when administered to a guilty suspect and 98% reliable when given to someone who is innocent. Suppose that of the 100 persons taken into custody, only 12 were actually involved in any wrongdoing. What is the probability that a given suspect is innocent given that the polygraph says he is guilty?
4. The daily number of orders filled by the parts department of a repair shop is a random variable with  $\mu = 142$  and  $\sigma = 12$ . According to Chebyshev's theorem, with what probability can we assert that on any one day it will fill between 82 and 202 orders?
5. The number of weekly breakdowns of a computer is a random variable having a Poisson distribution with  $\lambda = 0.3$ . What is the probability that the computer will operate without a breakdown for 2 consecutive weeks?
6. (a) A random variable X has a normal distribution with  $\mu = 62.4$ . Find its standard deviation if the probability is 0.2 that it will take on a value greater than 79.2.  
(b) Find the probability that X will take a value between 60 and 66.