MATH 323. TEST II

NAME:

Directions: You may use your own calculator and your own textbook. You may also use a summary (one side of an 8.5"x11" sheet of paper with notes in your writing). You may use nothing else. You may not pass a calculator, textbook or summary to another person. To receive full credit you must show all your work. Erase or cross out any work you do not want graded. You are taking this exam under the honor code.

1.(20 points) Memory chips are removed from obsolete computers and put into a large bin. Forty percent do not work in the new computers. Find the probability that you must try 3 chips to get 2 that work in a new model.

2.(20 points) Let X be a normal random variable with mean 1000 and standard deviation 200.

a) Find $P(X < 1300)$.

b) Find the number x such that $P(X > x) = 0.67$.

3.(20 points) The life of a certain kind of electronic component is distributed exponentially, with an average life of 3000 hours.

a) What is the probability that one of these components, chosen at random, will last at least 2000 hours?

b) A system is made of 3 such components which function independently. The system fails to function if at least one component is not working. What is the probability that the system will function less than 2000 hours ?

4.(20 points) Suppose the number of customers which arrive at a counter is modeled by a Poisson random variable, with an average of 7 customers per hour.

a) What is the probability that exactly two customers will stop at the counter during the next hour?

b) Let X be the time at which the 10th customer stops at the counter, measured in hours since the counter opens. Find $E(X)$ and $V(X)$.

5.(20 points) Let X be a continuous random variable with density function

$$f(x) = \frac{1}{2\theta} e^{-|x|/\theta} , \quad -\infty < x < +\infty ,$$

where $\theta > 0$ is a fixed constant. Find the expected value and the variance of X.