Practice Exam 3

1. Two dice are tossed and the lower of the two numbers is recorded. Find the expected value of this experiment.

2. A container of lightbulbs has a 5% defective rate. What is the probability that at least 3 bulbs out of 30 randomly chosen bulbs are defective?

3. A promoter is considering buying insurance for an outdoor concert in the case it rains. Insurance costs $3,000 and pays $30,000 if it rains. The promoter is expecting revenue of $35,000 if it does not rain. What must the chance of rain be in order for the promoter to be ambivalent about buying insurance.

4. What is the probability of success for a binomial random variable with 26 trials and an expected value of 4?

5. The life in hours of two brands of lightbulbs are shown below. Which brand of lightbulb has the longer average life? Which brand of lightbulb has the more predictable lifetime?
   Brand A: 121, 98, 61, 101, 90.
   Brand B: 79, 82, 68, 110, 115.

6. A random variable X has mean $\mu = 75$ and standard deviation $\sigma = 8$. Find the probability that X is between 63 and 87 using Chebychev's inequality.

7. The height of American men is normally distributed with mean $\mu = 70$ inches and standard deviation $\sigma = 2$ inches. Find the percentage of men who are more than $6' \ 6''$ tall. Find the percentage of men who are between $5'$ and $6'$ tall.

8. Find the standard deviation σ of a normally distributed random variable X having mean $\mu = 10$, if $\Pr(X \le 5) = .1056$.

9. Find the value of z for which $\Pr(Z \ge z) = .0668$ if Z is the standard normally distributed random variable with $\mu = 0$ and $\sigma = 1$.

10. An experiment consists of 20 binomial trials, each with probability 25% of success. Use an approximating normal curve with $\mu = np$ and $\sigma = \sqrt{npq}$ to approximate: exactly 5 successes, between 4 and 8 successes, and less than 9 successes.

11. About 5% of American women are 6 feet or taller. Estimate the probability of finding more than 3 women taller than 6 feet in a group of 12 American women.