MA 385-04 Name _____
Dr. Johnson

**HW #3**

The problems below are due on Tuesday Sept. 25 at 1:00p.m. If you think you might be even 5 minutes late to class, you should submit your homework before class. Show all steps leading to a solution. You will be graded on the correctness of your method as well as the correctness of your answer.

1. Mookie Betts plays right field for the Boston Red Sox. He is currently leading the American League with a .342 batting average. To keep it simple, assume this means that every time he is up to bat, he has a probability of .342 of getting a hit and that each at bat is independent. What is the probability that if you start keeping track today, he will get his $5^{th}$ hit on his $9^{th}$ at bat?

2. Roll two fair dice. Let $X_1$ = value on the first die and let $X_2$ = value on the second die. For each of the variables below, find the expected value and the variance of the variable.

   a) $Y = X_1 + X_2$, the sum of the scores
   b) $U = \min\{X_1, X_2\}$, the minimum score

3. Twelve customers are in line at Chik-fil-A. Suppose that each customer's order is independent from the other customers and that the probability a customer orders the regular chicken sandwich is .75 while the probability the customer orders the spicy chicken sandwich is .25. Find the probability that :
   a) All 12 customers order the regular chicken sandwich.
   b) No more than 3 customers order the spicy chicken sandwich.

4. Roll two fair dice. Use the Poisson approximation to find the probability that you will roll at least one double (meaning both dice land on the same value) in 24 trials. How does this compare to the exact value?

5. Suppose that X is a discrete random variable with the following probability mass function.

| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| f(x) | .1 | .15 | .2 | .25 | .2 | ? | ? |

   Find the values of f(5) and f(6) given that $\mu_x = 2.64$