HW 9

Group 1   **Grade:**

Suppose that 3 balls are chosen without replacement from an urn consisting of 5 white and 8 red balls. Let X_i equal 1 if the ith ball selected is white, and let it equal 0 otherwise. Give the joint probability function of

- X_1, X_2.

- X_1, X_2, X_3.

Group 2   **Grade:**

Consider a sequence of independent Bernoulli trails each of which is a success with probability p. Let X_1 be the number of failures preceding the first success, and let X_2 be the number of failures between the first and second successes. Find the joint probability mass function of X_1 and X_2.

Group 3   **Grade:**

The time that it takes to service a car is an exponential random variable with rate 1.

1. If A brings his car in at time 0 and B brings his car in at time t, what is the probability that B's car is ready before A's? Assume that the service times are independent, and the service begins upon arrival.

2. If both cars are brought in at time 0, with work starting on B's car only when A's car has been completely serviced, what is the probability that B's car is ready before 2?

Group 4   **Grade:**

Suppose X and Y are independent normal random variables with parameters (μ_X, σ_X) and (μ_Y, σ_Y), respectively. Find x such that $\mathbb{P}(X - Y > x) = \mathbb{P}(X + Y = a)$ for some constant a.

Group 5   **Grade:**

Let X and Y be independent random variables that are exponentially distributed with parameter λ for both. Compute the probability that the largerest of the two is twice as great as the other one.