STAT/MA 41600
In-Class Problem Set #34: November 3, 2017

1. Suppose that X is a Beta random variable with parameters $\alpha = 3$ and $\beta = 2$. Calculate $P(|X - 1/2| < 1/6)$.

2. Consider a store for which the percentage of female shoppers on a given day is modelled by a Beta random variable X with $\alpha = 3$ and $\beta = 4$. Find the probability that, on a given day, there are less than 30% female shoppers, i.e., find $P(X < 0.3)$.

3. Reconsider the random variable X from question 1. Suppose U is a continuous uniform random variable on $(0, 3)$, which is independent of X. Find the probability that U is larger than X, i.e., find $P(U > X)$. Hint: If U exceeds 1, then U is certainly larger than X.

4. Review question: Suppose that X and Y are independent random variables with probability mass functions $p_X(x) = (2/3)^{x-1}(1/3)$ for integers $x \geq 1$, and $p_Y(y) = (1/5)^{y-1}(4/5)$ for integers $y \geq 1$. Find $P(Y < X)$.