

STAT/MA 41600
In-Class Problem Set #34: November 2, 2018

1. In a certain forest, let X denote the percentage of days (in a certain chosen period of time) on which it rains. Suppose that X is a Beta random variable with $\alpha = 6$ and $\beta = 2$.
 - 1a. What is the expected value of X ?
 - 1b. What is the probability density function of X ?
 - 1c. Verify that this function is a valid probability density function.
2. For the random variable X in question 1, find $P(X < 1/4)$.
3. Suppose that X —the percentage of time that Forrest feels hungry—is a Beta random variable with parameters $\alpha = 2$ and $\beta = 3$.

Suppose that U is a continuous uniform $(0, 1)$ random variable.
Calculate $P(U > X)$.
4. Review question: Suppose that Forrest rolls a die until the first occurrence of 6, and then he stops; let X denote the number of his rolls. Suppose that Dr. Ward flips a coin until the first head appears, and then he stops; let Y denote the number of his flips. If X and Y are independent, find $P(X \geq Y)$.