

STAT/MA 41600
In-Class Problem Set #32: October 26, 2018

1. Suppose that U is a continuous uniform random variable on $[0, 10]$, suppose that X is an exponential random variable with $\mathbb{E}(X) = 5$. If U and X are independent, find $P(X > U)$.

2. At a city park in Mishawaka, suppose that an ornithologist waits for the next bird to arrive. She wants to take an excellent picture of the bird. At a certain time of day, she believes that the interarrival times of the birds are independent exponential random variables, with mean of 10 seconds.

Let X denote the time (in seconds) until the next bird's arrival.

2a. Find $P(|X - 8| \leq 2)$.

2b. Find $P(X \geq 12 \mid X \geq 9)$.

3. In a busy newsroom, suppose that the times until the next phone ringing, next email arriving, or next computer beeping are independent exponential random variables, with respective means of 30 seconds, 20 seconds, and 15 seconds. Find the probability that the next email arrives before the phone rings or the computer beeps.

4. Let X and Y be independent exponential random variables with $\mathbb{E}(X) = 3$ and $\mathbb{E}(Y) = 4$. Find $P(Y/2 < X < Y)$.