Homework Set 9

Due: Apr 27, 2020 (via Blackboard by 11:00am)

To be handed in:

Please write your solution to Problems 1 and 2 on a single sheet of paper!

1. Let X be a uniformly distributed random variable in the interval $[0, 1]$.
   1. Find the probability density function $f_Y(y)$ of the random variable $Y = e^X$.
   2. Verify that $\displaystyle\int_{-\infty}^{+\infty} f_Y(y)\, \mathrm{d}y = 1$.
   3. Is Y an exponential random variable?

2. While social distancing, people are still meeting up online (e.g. via Zoom or Skype). Suppose that friends X and Y agree to meet online, by joining the same virtual chat room sometime between 3.00pm and 4.00pm of a given day. Assume that X logs in to the chat room at a time uniformly distributed between 3.15pm and 3.45pm, while Y logs in to the chat room at a time uniformly distributed between 3.00pm and 4.00pm.
   1. What is the probability that the friend that logs in first will wait less than 5 minutes for the other friend to join?
   2. What is the probability that X arrives first?