Econ 7710
Assignment 1

The due date for this assignment is Friday September 15th by 9am EST

1. A die is tossed n times. Find the probability of events where

   (i) At least one of the outcomes is equal to 6.

   (ii) An outcome equal to 6 is observed exactly once.

2. A couple have arranged a date between 7 and 8pm, but agreed to wait for each other no longer than 10 minutes. Suppose that the arrival of each person is uniformly random within the hour when they agreed to meet.

   (a) Find the probability that the date will occur

   (b) Suppose that an angry ex boyfriend may crash the date (he also waits for 10 minutes and his arrival time is uniformly random within the hour). (i) Find the probability that ex boyfriend indeed crashes the date (i.e. all three meet). (ii) Find the probability that ex boyfriend will meet his potential replacement.

3. Is it true that if random variable X distributed on a bounded segment $[a, b]$ has a density almost everywhere on this segment, then its cumulative distribution function is uniformly continuous? Formally prove that this is true or produce a counterexample and provide sufficient conditions for the statement to become true.

4. n marbles are placed in n urns such that each marble is equally likely to be placed in each of n urns. What is the probability that no urn is empty?

5. Let $F(\cdot)$ and $G(\cdot)$ be two distribution functions. Find *necessary and sufficient conditions* that $H(x) = F(G(x))$ is a distribution function.