

STAT/MA 41600
In-Class Problem Set #31: October 26, 2016

1. Consider two independent random variables X and Y that are each uniformly distributed on the interval $[0, 10]$.

Find $P(|X - Y| < 1)$, i.e., find the probability that X and Y are less than 1 unit apart. Hint: Think about the 10×10 grid where (X, Y) is located. What is the area of the region where $|X - Y| < 1$?

2. Suppose that the grades of two students are independent and each are uniformly distributed in the interval $[90, 100]$. Find the probability that the sum of the two grades is 197 or higher.

3. Suppose that U is uniformly distributed on the interval $[0, 5]$.

3a. What is the CDF of U ?

3b. Now define $X = 3U + 2$. What is the CDF of X ?

3c. What kind of distribution does X have?

4. Let U and V be independent and uniformly distributed on the interval $[0, 3]$.

Let $X = \max(U, V)$. Let $Y = \min(U, V)$.

4a. What is the CDF of X ?

4b. What is the probability density function of X ?

4c. What is the CDF of Y ?

4d. What is the probability density function of Y ?