UCONN
UNIVERSITY OF CONNECTICUT

Department of Statistics
College of Liberal Arts & Sciences

# STAT 3375Q: Introduction to Mathematical Statistics I

Spring 2024

**Week 13 Homework Exercises** Discussion Date: 19 April 2024

**Problem 6.72**
Let $Y_1$ and $Y_2$ be independent and uniformly distributed over the interval $(0, 1)$. Find

a) the PDF of $U_1 = \min(Y_1, Y_2)$.

b) $E(U_1)$ and $V(U_1)$.

*Solution:*

**Problem 6.73**
Let $Y_1$ and $Y_2$ be independent and uniformly distributed over the interval $(0, 1)$. Find

a) the PDF of $U_2 = \max(Y_1, Y_2)$.

b) $E(U_2)$ and $V(U_2)$.

*Solution:*

**Problem 6.74**
Let $Y_1, Y_2, \ldots, Y_n$ be independent, uniformly distributed random variables on the interval $[0, \theta]$. Find the

a) CDF of $Y_{(n)} = \max(Y_1, Y_2, \ldots, Y_n)$.

b) PDF of $Y_{(n)}$.

c) $E(Y_{(n)})$ and $V(Y_{(n)})$.

*Solution:*

**Problem 6.75**
Refer to Exercise 6.74. Suppose that the number of minutes that you need to wait for a bus is uniformly distributed on the interval $[0, 15]$. If you take the bus five times, what is the probability that your longest wait is less than 10 minutes?

*Solution:*

**Problem 6.80**
Let $Y_1, Y_2, \ldots, Y_n$ be independent random variables, each with a beta distribution, with $\alpha = \beta = 2$. Find

a) CDF of $Y_{(n)} = \max(Y_1, Y_2, \ldots, Y_n)$.

b) PDF of $Y_{(n)}$.

c) $E(Y_{(n)})$ when $n = 2$.

*Solution:*