MTH 372
Hw 2
Due Thursday, 9/16/2021.

Solutions are required, not just answers. Unsupported answers will recieve little or no credit.

Read Chapters 4,5 of *Huber*.

p.28 #4.2 Suppose $Y \sim \text{Unif}[0, 10]$.
(a) Find $\text{P}(Y \in [3, 7])$.
(b) Find $\text{P}(Y \in [6, 12])$.

#4.4 Suppose that $U = (U_1, U_2)$ is uniformly chosen over the region
$\{(x; y) : x \geq 2, 0 \leq y \leq 1/x^2\}$.
(a) What is $\text{P}(U_1 \leq 5)$?
(b) What is $\text{P}(U_2 \geq .01)$?

#4.5 (revised) Let U_1 and U_2 be independent uniform random variables over $[0, 1]$. What is the chance that $5\,U_2 < U_1$?

#4.8 Suppose that (U_1, U_2) is uniform over the quadrilateral region with vertices (0, 0); (0, 1); (2, 2); (2, 0). Prove that U_1 and U_2 are not independent. (Hint: Start by drawing a picture.

#5.2 Suppose $U \sim \text{Unif}([0, 1])$ and $W = 1/U$.
(a) Find $\text{P}(W \geq 2)$.
(b) Find $\text{P}(W \geq -2)$.

#5.4 Let $U \sim \text{Unif}([-1, 1])$. Find the cdf of U^3.

#5.10 Suppose that (U_1, U_2) is uniform over the quadrilateral region with vertices $(0, 0)$; $(0, 1)$; $(2, 2)$; and $(2, 0)$. Find the cdf of U_1.

#5.12 Suppose $T \sim \text{Exp}(2)$. Find and graph $F_T(t)$.