AMAT 362—Work Sheet 19

Dr. Justin M. Curry

Due: April 20, 2022. Worth 20 points.

Name: _____

1. (3 points) 10,000 electrical components are found, on average, to have an individual lifetime of 20 days. Let N_d be the number of components among the original 10,000 which survive more than d days.
   (a) (2 points) Find $E(N_d)$ and $SD(N_d)$ for $d = 10, 20$ and 30.

   (b) (1 point) What's the expected time of the first component's failure?

2. (5 points) Suppose $X \sim \text{Unif}[0, 1]$ and $Y \sim \text{Unif}[0, 2]$ are independent random variables.
   (a) (2 points) Determine the CDFs of X and Y separately.

   (b) (1 point) Determine the PDF of $\min\{X, Y\}$.

(c) (2 points) Determine the PDF of $\max\{X, Y\}$

3. (1 point) Suppose $X \sim \text{Unif}(0, 1)$. Find the distribution of $Y = -\lambda^{-1} \log(X)$.

4. (2 points) Suppose $X \sim \text{Unif}(0, 1)$. Find the distribution of $Y = X^2$.

5. (2 points) Suppose $X \sim \text{Unif}(-1, 1)$. Find the distribution of $Y = X^2$.

6. (2 points) Suppose $X \sim \text{Unif}[-1, 2]$. Find the distribution of $Y = X^2$.

7. (2 points) Suppose $X \sim \text{Unif}[-2, 3]$. Find the distribution of $Y = |X - 1|$.

8. (3 points) Suppose $X \sim \text{Norm}(0, 1)$. Find the distribution of $Y = e^X$.