

Name: _____ Student ID: _____

Week8-template

Math 563, Fall 2022

Q 1. Let T_1, T_2, \dots, T_n be non-negative, independent continuous random variables and let

$$V = \min(T_1, T_2, \dots, T_n)$$

be their minimum. Let $f_j(t) = f_{T_j}(t)$ be their pdf and $F_j(t)$ be the corresponding cdf. Let $G_j = 1 - F_j$ be the tail probability. Let I be the index of the smallest of T_i , i.e. $I = i$ iff $\forall j \neq i : T_i < T_j$.
All answers must be expressed in terms of f_j and G_j .

Q 1.1. Find the tail probability $\mathbb{P}(V > t)$.

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Q 1.2. Find the probability function of I , i.e., $\mathbb{P}(I = i)$.

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Q 1.3. Find $\mathbb{P}(V > t | I = i)$. Explain your reasoning, paying attention to proper notation.

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Q 1.4. Use the Bayes formula for conditional expectations to find $\mathbb{P}(I = i|V = t)$. Explain your reasoning, paying attention to proper notation.

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THE ANSWER