

**Mathematics 1550H – Probability I: Introduction to Probability**

TRENT UNIVERSITY, Summer 2023 (S62)

**Assignment #4**

**A Continuous Grind**

*Corrected the density function on 2023-07-08.*

*Due\* just before midnight on Friday, 14 July.*

Suppose  $X$  is a continuous random variable whose probability density function is

$$f(x) = \begin{cases} xe^{-x} & x \geq 0 \\ 0 & x < 0 \end{cases}.$$

1. Verify that  $f(x)$  is indeed a valid probability density function. [1.5]
2. Compute the expected value  $E(X)$  of  $X$ . [1.5]
3. Compute the variance  $V(X) = E(X^2) - [E(X)]^2$  of  $X$ . [2]

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\* You should submit your solutions via Blackboard's Assignments module, preferably as a single pdf. If this fails, you may submit your work to the instructor on paper or by email to [sbilaniuk@trentu.ca](mailto:sbilaniuk@trentu.ca).