Full Name: _____

Student No: _____

Grade:

For each answer, **provide a short argument**.

1. (1 point) Let U and V be independent standard normal random variables. What is the distribution of $3U - 4V + 5$?

2. (1 point) In a certain city, fatal traffic accidents occur according to a Poisson process with an average rate of 7 per year. What is the probability that the 2nd fatal accident in 2024 occurs by the end of January? [*Note*: 2024 will be a leap year, which means it will have 366 days. January has 31 days.]

Answer:

3. (3 points) Let T be an exponential random variable with rate 5.

   (a) What is the probability that $-1 \leq T \leq 1$?

   Answer:

   Now, consider the random variable $X = \mathrm{e}^{-T}$.

   (b) What are the possible values of X?

   (c) Find the probability density function of X.

4. (0 points) On the scale of 0–5, what is your estimate of your grade on this quiz?