STU22004 – Sample Questions 5

1. If $f(x) = 2e^{-2x}\ \ x > 0$, find $Var[X^2 + 1]$
2. If you arrive the bus stop at 11:00, what is the probability of waiting more than 5 minutes, assuming the bus arrived randomly between 11:00 and 11:25?
3. If $X \sim N(1,1)$ find the $P(X > 2|X > 1)$.
4. Taking 2 samples from RV X with pdf of $f(x) = ax + \frac{1}{2}\ \ -1 \leq x \leq 1$, what is $P(X_1X_2 < 0)$?
5. By choosing a random point on a line with length l, you split the line into two parts with length X and $l - X$. What is the probability that the ratio of the length if the shorter piece to the length of the longer piece is less that $\frac{1}{4}$?
6. In an exponential RV, find the interquartile range $(Q_3 - Q_1)$?
7. In a shop, the customers arrive with mean of 20 people per hour. What is the probability that the first customer arrives after 5 minutes?
8. If $F_X(x) = \begin{cases} a & x < 0 \\ \frac{x^2}{5} & 0 \leq x < 2 \\ b & x \geq 2 \end{cases}$ find $Var[X]$.