

MTH 422

Exam 3 In-Class Portion

Spring 2022

Show all work in a neat and organized fashion. Clearly indicate your answers.

1. In a small metropolitan area, annual losses due to storm, fire, and theft are assumed to be mutually independent, exponentially distributed random variables with respective means 2.0, 2.5, and 3.6.

Calculate the probability that the maximum of these losses exceeds 4.

2. Workplace accidents are categorized into three groups: minor, moderate and severe. The probability that a given accident is minor is 0.60, that it is moderate is 0.35, and that it is severe is 0.05.

Two accidents occur independently in one month.

Calculate the probability that neither accident is severe and at most one is moderate.

3. A random variable X has the cumulative distribution function

$$F(x) = \begin{cases} 0, & x < 1 \\ \frac{x+1}{4} & 1 \leq x < 3 \\ 1 & x \geq 3. \end{cases}$$

Calculate the variance of X .

4. A company buys a policy to insure its revenue in the event of major snowstorms that shut down business. The policy pays nothing for the first such snowstorm of the year and 10,000 for each one thereafter, until the end of the year. The number of major snowstorms per year that shut down business is assumed to have a Poisson distribution with mean 2.2.

Calculate the expected amount paid to the company under this policy during a one-year period.