Suppose that the duration of a randomly selected rainfall event in a particular location (call this random variable $X$) follows an exponential distribution with mean 2.5 hours.

1. Write out the cumulative distribution function (cdf) of $X$.

2. Calculate the probability that a randomly selected rainfall event lasts for more than 2 hours.

3. Given that a rainfall event has already lasted for 8 hours, determine the probability that it lasts for at least two more hours. Explain your answer.

4. Determine the 75th percentile of $X$ (i.e., the value such that 75% of rainfall events last for less long than this value.).

5. Determine the probability that the duration of a randomly selected rainfall event falls within one standard deviation of the mean.