5.7: Chapter Key Terms

Key Terms	Definition
Conditional Probability	the likelihood that an event will occur given that another event has already occurred.
decay parameter	The decay parameter describes the rate at which probabilities decay to zero for increasing values of x. It is the value m in the probability density function $f(x) = me^{(-mx)}$ of an exponential random variable. It is also equal to $m = \frac{1}{\mu}$, where μ is the mean of the random variable.
Exponential Distribution	a continuous random variable (RV) that appears when we are interested in the intervals of time between some random events, for example, the length of time between emergency arrivals at a hospital. The mean is $\mu = \frac{1}{m}$ and the standard deviation is $\sigma = \frac{1}{m}$. The probability density function is $f(x) = me^{-mx}$ or $f(x) = \frac{1}{\mu}e^{-\frac{1}{\mu}x}$, $x \geq 0$ and the cumulative distribution function is $P(X \leq x) = 1 - e^{-mx}$ or $P(X \leq x) = 1 - e^{-\frac{1}{\mu}x}$.
memoryless property	For an exponential random variable X, the memoryless property is the statement that knowledge of what has occurred in the past has no effect on future probabilities. This means that the probability that X exceeds $x + t$, given that it has exceeded x, is the same as the probability that X would exceed t if we had no knowledge about it. In symbols we say that $P(X > x + t \mid X > x) = P(X > t)$.
Poisson distribution	If there is a known average of \mu events occurring per unit time, and these events are independent of each other, then the number of events X occurring in one unit of time has the Poisson distribution. The probability of x events occurring in one unit time is equal to $P(X = x) = \frac{\mu^x e^{-\mu}}{x!}$.
Uniform Distribution	a continuous random variable (RV) that has equally likely outcomes over the domain, $a < x < b$; it is often referred as the rectangular distribution because the graph of the pdf has the form of a rectangle. The mean is $\mu = \frac{a+b}{2}$ and the standard deviation is $\sigma = \sqrt{\frac{(b-a)^2}{12}}$. The probability density function is \(f(x)=\frac{1}{b-a} \text { for } a