$$
\begin{aligned}
Var(X) &= nq(1-q) \\
\psi(s) &= (qe^s + (1-q))^n.
\end{aligned}
$$

Poisson

In RM, the Poisson distribution is used as a model of demand or as a (continuous parameter) approximation to the Binomial distribution. It is characterized by a single nonnegative parameter λ (its mean).

The basic definitions and properties are

$$
\begin{aligned}
P(x) &= e^{-\lambda}\frac{\lambda^x}{x!},\ x = 0, 1, \ldots \\
E[X] &= \lambda \\
Var(X) &= \lambda \\
\psi(s) &= e^{\lambda(e^s-1)}.
\end{aligned}
$$

Continuous Distributions

Uniform

A uniform distribution is defined by two constants $a < b$ and represents a case where the random variable is equally likely to assume any value in the interval $[a, b]$.

The basic definitions and properties are

$$
\begin{aligned}
f(x) &= \frac{1}{b-a},\ a \le x \le b \\
E[X] &= \frac{a+b}{2} \\
Var(X) &= \frac{(b-a)^2}{2} \\
\psi(s) &= \frac{e^{sb} - e^{sa}}{s(b-a)}.
\end{aligned}
$$

Exponential

The exponential distribution is defined by a single parameter λ.

The basic definitions and properties are

$$
\begin{aligned}
f(x) &= \lambda e^{-\lambda x},\ x \ge 0 \\
E[X] &= \frac{1}{\lambda} \\
Var(X) &= \frac{1}{\lambda^2} \\
\psi(s) &= \frac{\lambda}{\lambda - s}.
\end{aligned}
$$