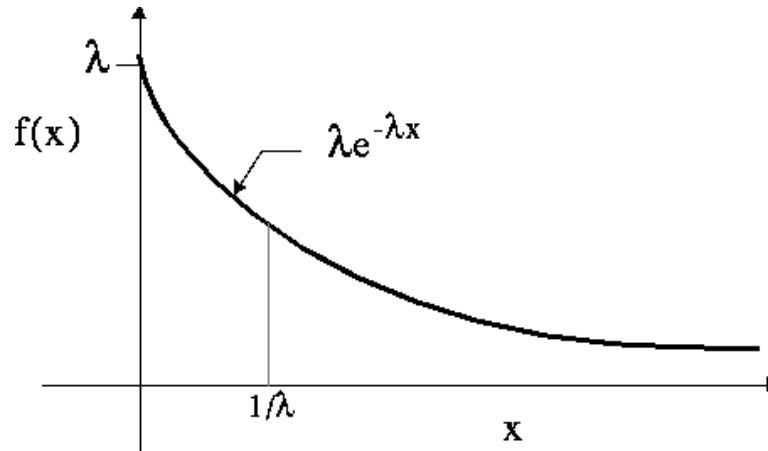


Exponential Distributions

The exponential distribution is used to describe events that occur at a consistent rate, continuously and independent of one another, over a set period of time. Each exponential distribution will be given with a rate parameter, lambda (λ) or a mean (expected) value, μ . And each exponential distribution is defined as $f(x) = \lambda e^{-\lambda x}$.



The relationship between λ and μ is given as follows:

- $\lambda = \frac{1}{\mu}$ and $\mu = \frac{1}{\lambda}$

For every exponential distribution, the mean and standard deviation are equal.

Therefore, $\mu = \sigma$.

Percentile Formulas:

- $P(X < x) = 1 - e^{-\lambda x}$
- $P(X > x) = e^{-\lambda x}$
- $P(x_1 < X < x_2) = (1 - e^{-\lambda x_2}) - (1 - e^{-\lambda x_1})$

To find the value of x for a given percentile use:

$$\frac{\ln[1 - P(x)]}{-\lambda} = x$$