Example

- Suppose that electricity power failures occur according to a Poisson distribution with an average of 2 outages every twenty weeks.
- Calculate the probability that there will not be more than one power outage during a particular week.

Solution:

- The average number of failures per week is: $m = 2/20 = 0.10$
- "Not more than one power outage" means we need to compute and add the probabilities for "0 outages" plus "1 outage".

Recall:

$$P(X = k) = e^{-m} \times \frac{m^k}{k!}$$

- $P(X = 0)$

$$P(X = 0) = e^{-0.10} \times \frac{0.10^0}{0!} = e^{-0.10} = 0.9048$$

- $P(X = 1)$

$$P(X = 1) = e^{-0.10} \times \frac{0.10^1}{1!} = e^{-0.10} \times 0.1 = 0.0905$$

- $P(X \leq 1)$

$$P(X \leq 1) = P(X = 0) + P(X = 1) = 0.9048 + 0.0905 = 0.995$$