1 Deaths from Horse Kicks
After analyzing data from the Prussian cavalry for a period of 20 years, statisticians came to the conclusion that the number of deaths from horse kicks follows a Poisson distribution with \( \lambda = 0.6 \).
Let \( X \) be the number of deaths from horse kicks in 20 years.
What is the probability that
a) no deaths occurred?
b) one or two deaths occurred?
c) 3 or more deaths occurred?
d) more than 3 deaths occurred?

2 Which distribution is it?
Some jobs submitted for processing on a particular CPU have fatal programming errors, while others do not. Suppose that the long run fraction of jobs with fatal programming errors is \( p = 0.05 \).
a) Find the probability that among the next 10 jobs submitted there are less than 3 with fatal errors. Define a random variable and state your distribution assumption.
b) Find the probability that among the next 25 jobs submitted there are less than 5 with fatal errors. Define a random variable and state your distribution assumption.
c) One begins monitoring the processing of jobs and lets
\[ X = \text{the total number of jobs processed before the first with a fatal error.} \]
What is the distribution of \( X \)? Find \( P(X \leq 30) \)
d) Monitor the processing of jobs again and define
\[ Y = \text{the total number of jobs processed until the 2nd with a fatal error.} \]
Find the probability mass function for \( Y \).

3 Homicides in Chicago
It has been suggested that the number of homicides that happen during one month in Des Moines follow a Poisson distribution with parameter \( \lambda = 3 \).
(a) What is the probability that there occur less than 4 homicides in Des Moines in two months?
(b) In a given month the number of homicides in Chicago has been 24. Does this indicate that Chicago is as safe as Des Moines? Explain why or why not.