**Chapter 3: Discrete Random Variables and Probability Distributions**

1. **OUTLINE**

3-1 Discrete Random Variables

3-2 Probability Distributions and Probability Mass Functions

3-3 Cumulative Distribution Functions

3-4 Mean and Variance of a Discrete Random Variable

3-5 Discrete Uniform Distribution

3-6 Binomial Distribution

3-7 Geometric and Negative Binomial Distributions

3-8 Hypergeometric Distribution

3-9 Poisson Distribution

**3-1 Discrete Random Variables**

A discrete random variable is a random variable with finite(or countably infinite) ranges.

Examples of discrete random variables:

- Number of scratches on a surface.

- Proportion of defective parts among 1000 tested.

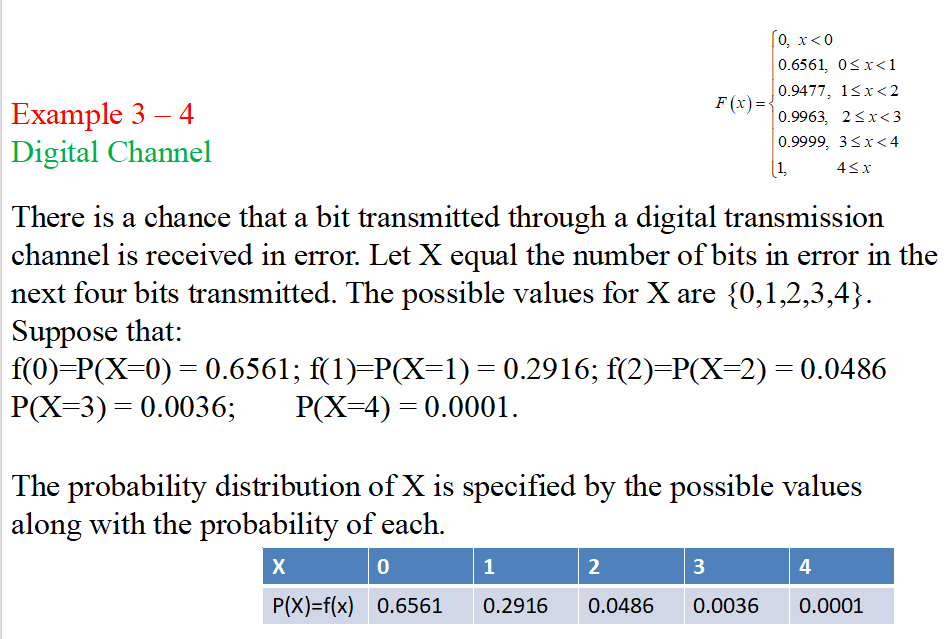
- Number of transmitted bits received in error.

**3-2 Probability Distributions and Probability Mass Functions**

**Probability Distributions**

The probability distribution of a random variable X is a description of the probabilities associated with the possible values of X.

For a discrete random variable, the distribution is often specified by just a list of the possible values along with the probability of each. In some cases, it is convenient to express the probability in terms of a formula.

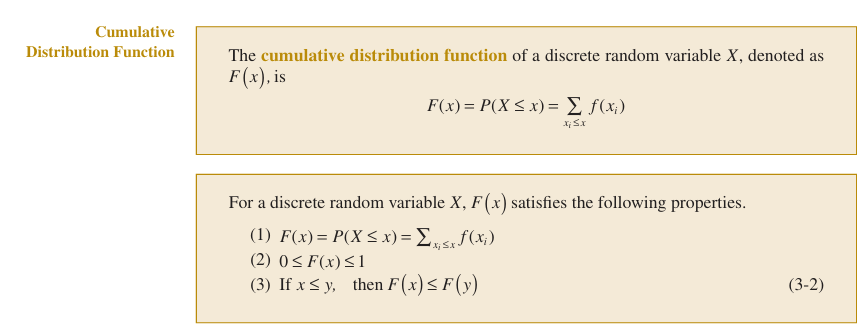


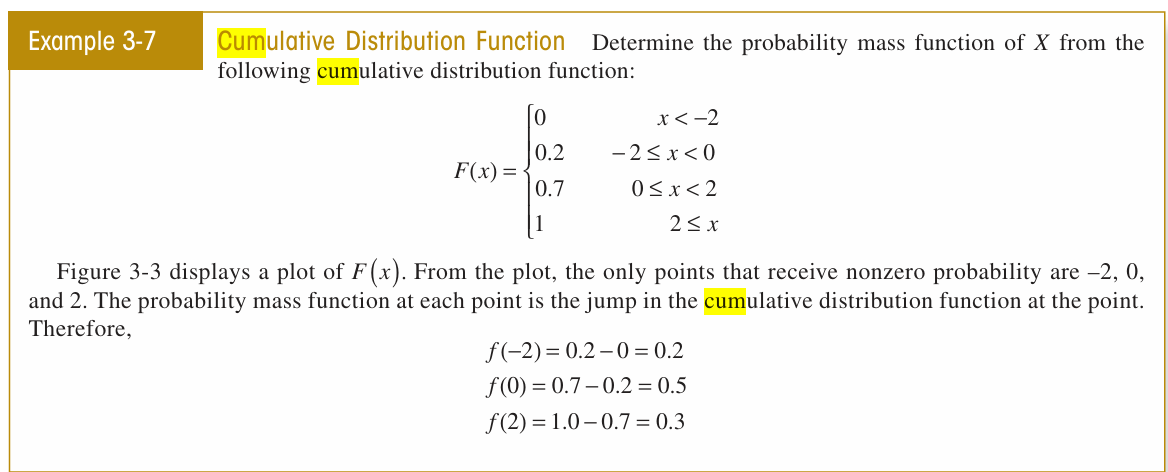
**Probability Mass Functions**

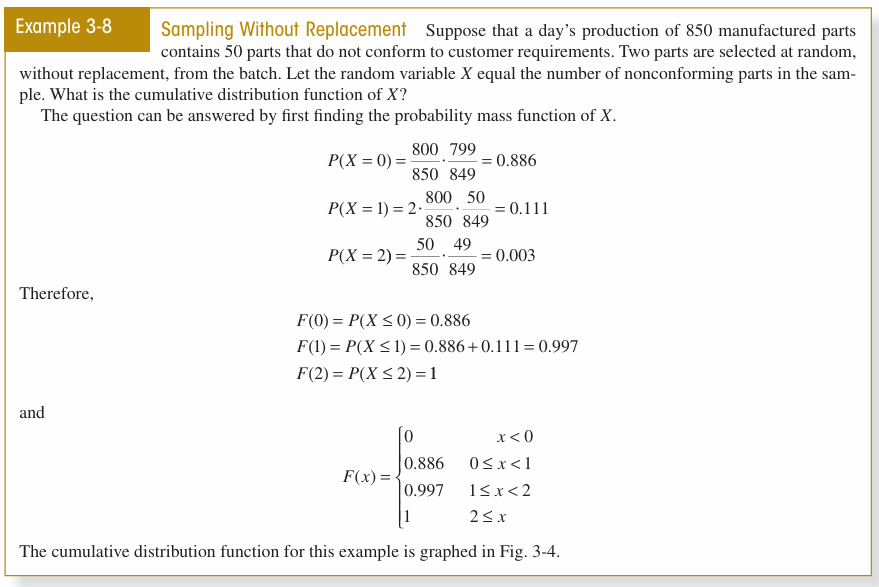


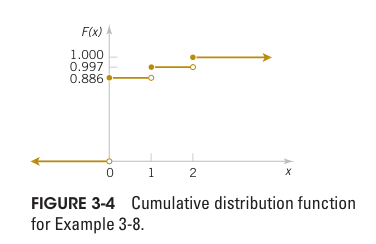


**3-3 Cumulative Distribution Functions**

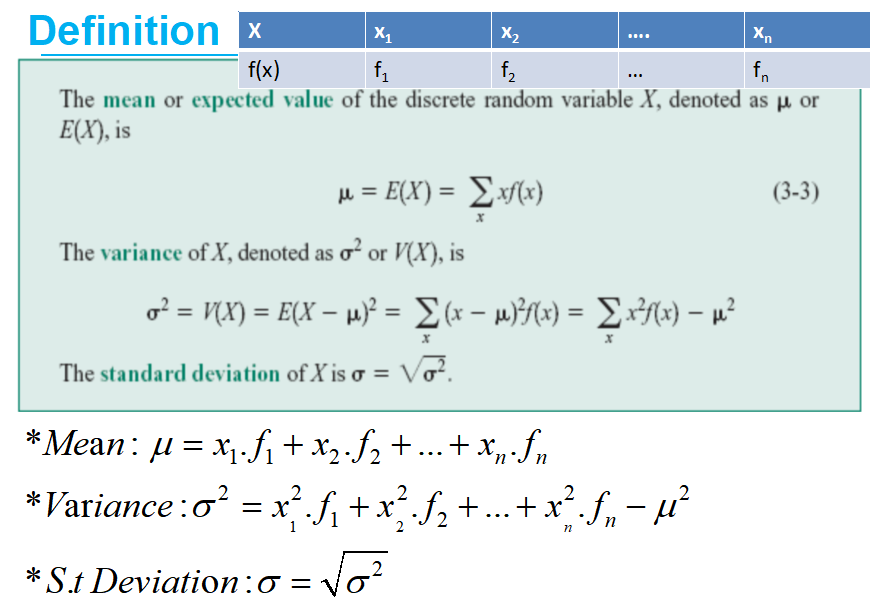


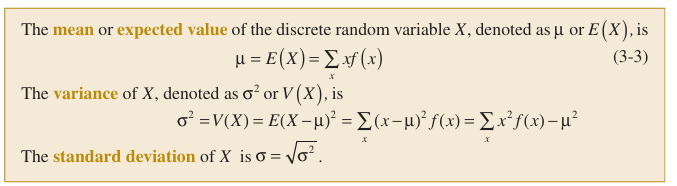


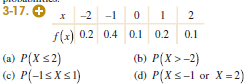
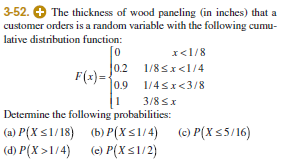




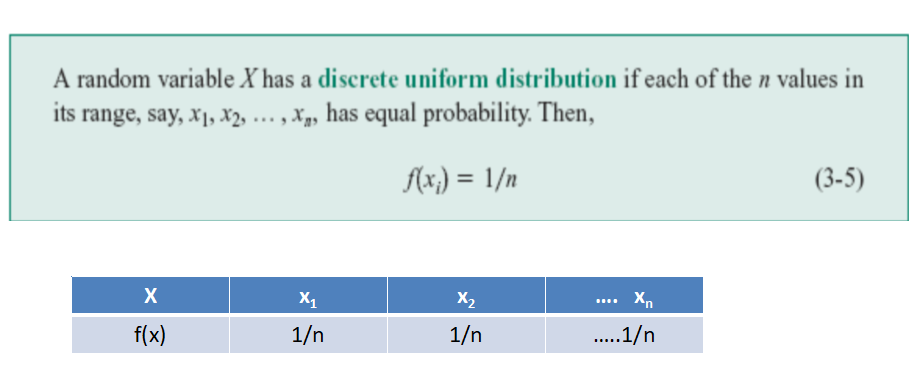
**3-4 Mean and Variance of a Discrete Random Variable**



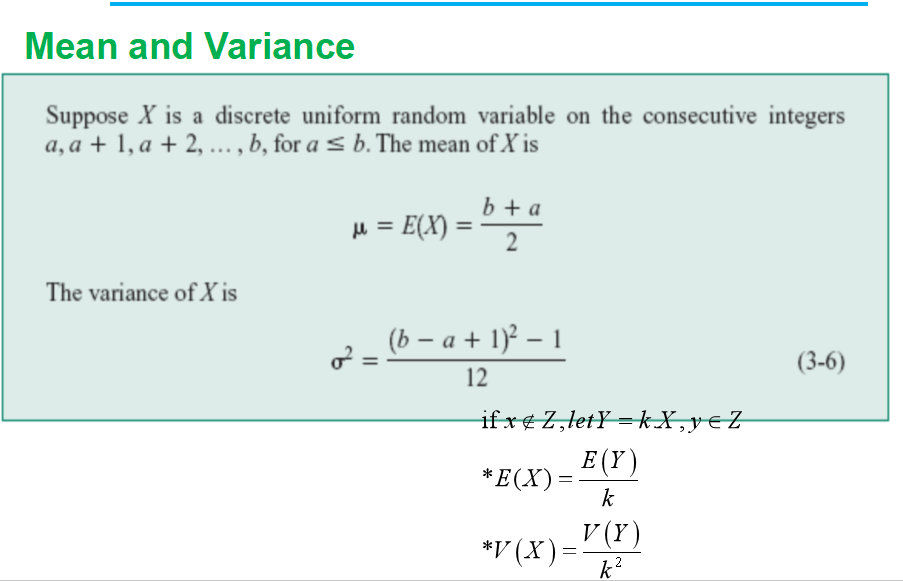


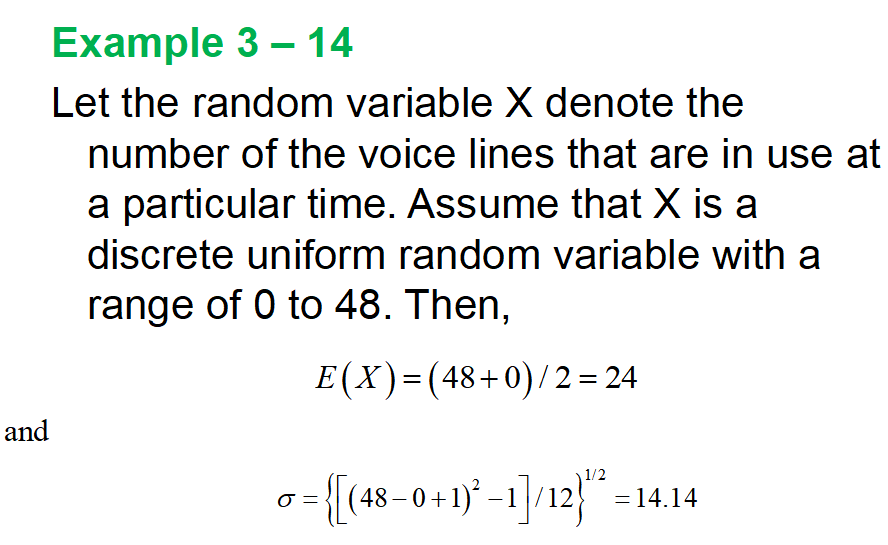
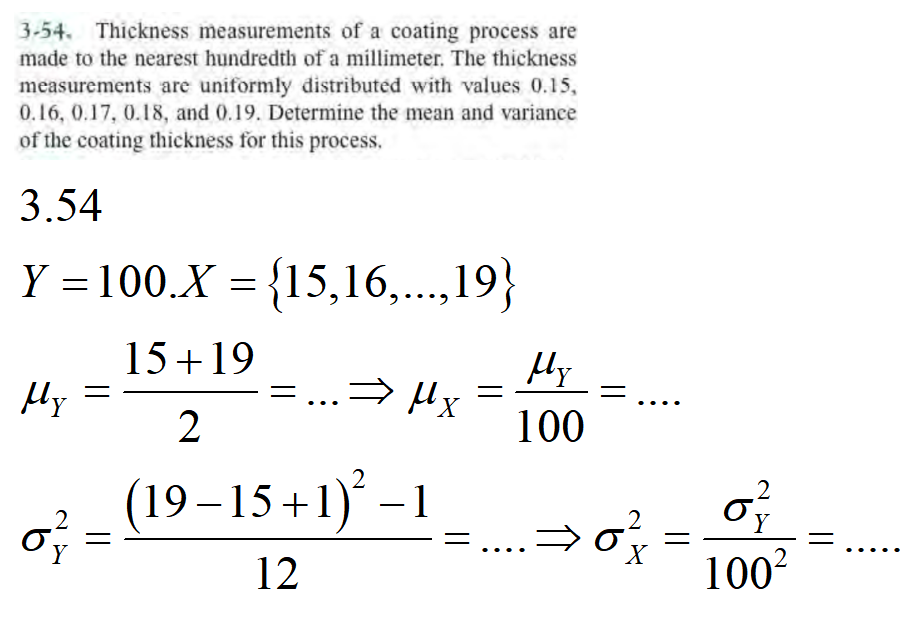


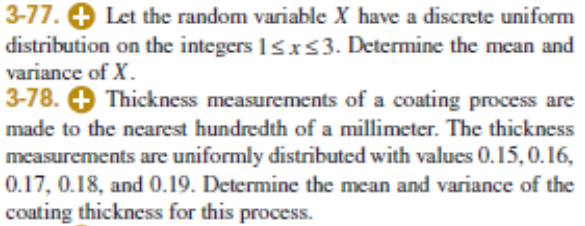
**3-5 Discrete Uniform Distribution**



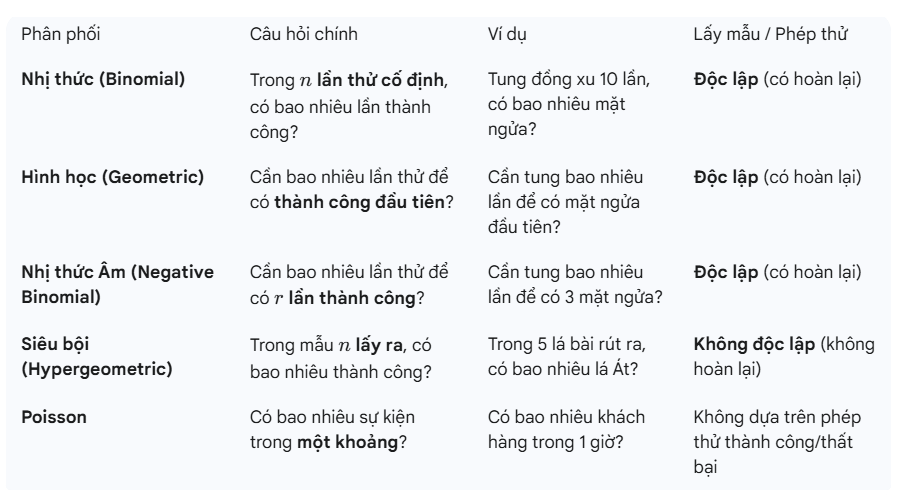


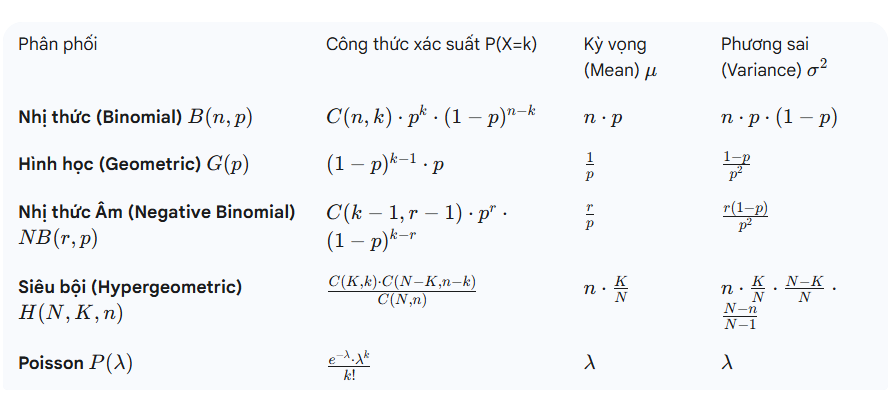


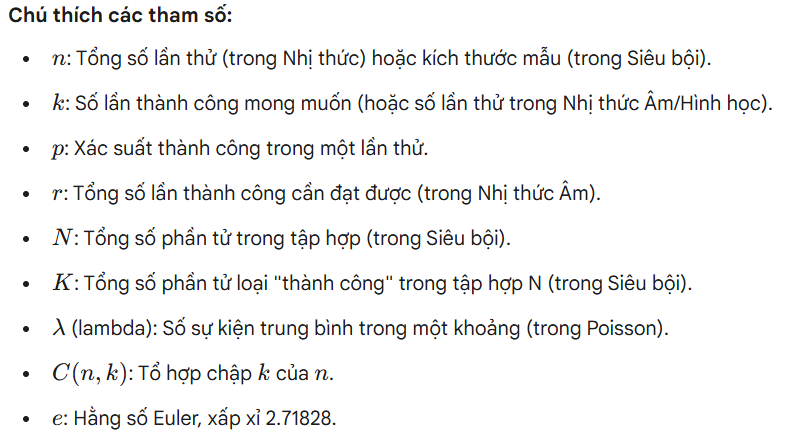




1. **. Distribution**

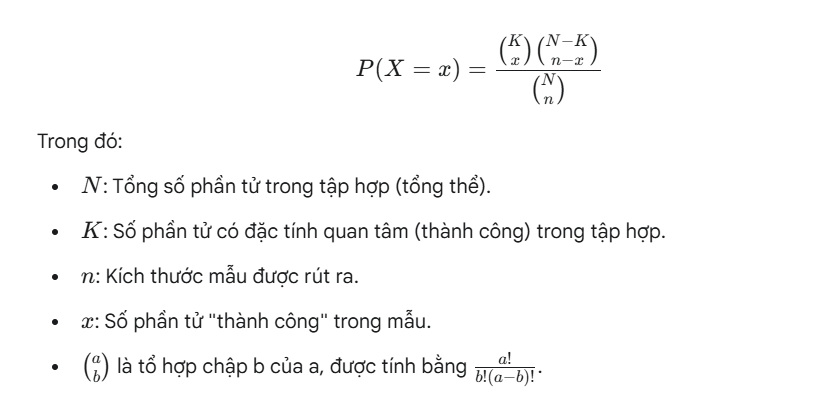






**Ví dụ:**

Phân phối siêu bội (hypergeometric distribution).



**Bài tập:**

Cho một phân phối siêu bội với N=100, n=4, và K=20.

