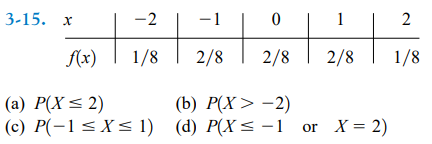
**Chapter 3: Discrete random variables and Probability distribution**

1. **Discrete random variables  
   Discrete** variables produce outcomes that come from a **counting process.**

(e.g., number of classes you are taking). \*the number of

1. **Probability distribution table → ?population mean=expected value, population variance, population standard deviation, probability**

**--> population**

P(X<=2) = 1

P(X>-2) = P(X=-1) + P(X=0) + P(X=1) + P(X=2)

= 2/8 + 2/8 + 2/8 + 1/8 = 7/8

P(X<3) = 1

P(X=0) = 2/8

P(X=3) = 0

P(X=0.75) = 0

1. **Probability mass functions**

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**f(x) = P(X=x)**

1. **Cumulative distribution function**

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1. **Mean and Variance of a Discrete Random Variable 🡪 CASIO**

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1. **Mean**

**580VN: Menu - 6 - 1 - Data - AC - OPTN - 2**

**570VN: Mode - 3 - 1 - Data - AC - Shift - 1 - 4 - 2**

1. **Variance**

**580VN: Menu - 6 - 1 - Data - AC - OPTN - 2**

**570VN: Mode - 3 - 1 - Data - AC - Shift - 1 - 4 - 3 - ^2**

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1. **Discrete Probability Distributions**

**probability**

**mean/variance/standard deviation**

**range**

| **Distribution** | **Notation** | **Range** | **pmf** | **Mean/Expected Value** | **Variance** |
| --- | --- | --- | --- | --- | --- |
| **i. Discrete Uniform** |  |  |  |  |  |
| **ii. Binomial** |  |  |  |  |  |
| **iii. Geometric** |  |  |  |  |  |
| **iv. Negative binomial** |  |  |  |  |  |
| **v. Hypergeometric** |  |  |  |  |  |
| **vi. Poisson** |  |  |  |  |  |

1. **Discrete uniform distribution**

X: a discrete uniform random variable over the integer set (a, a+1, …, b)

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X ~ Discrete Uniform (0, 99)

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P(X<6) =

1. **Binomial distribution**

X: the number of successes in n trials

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1. **Geometric distribution**

X: the number of trials until the first success

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1. **Negative binomial distribution**

X: the number of trials until r successes occur

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1. **Hypergeometric distribution**

X: the number of successes in the sample

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1. **Poisson distribution**

X: the number of events in a given unit of time/distance/area/volume

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