Review - Discrete Random Variables

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Random Variables

- Define a random variable (give both the formal and informal definition.)
- Define $\mathcal{X}$, the range of X.
- A RV X is *discrete* if:

Probability Mass Functions

If X is a discrete random variable with PMF $f(x)$, then $f(x) = P(\quad)$

We say that $f(x)$ is a valid PMF if

1.

2.

Cumulative Distribution Functions

If X is a discrete random variable with CDF $F(x)$, then $F(x) = P(\quad)$

What are the two requirements for $F(x)$ to be a valid CDF?

1.

2.

How do we find the CDF $F(x)$ given a PMF $f(x)$?

If X is a discrete random variable with CDF $F(x)$ and range $\mathcal{X} = \{a, a+1, \cdots b\}$ for $a, b \in \mathbb{Z}$, then $f(x) =$

Expected Values and Variance

- $E(X) =$
- $E(g(X)) =$
- Give two ways of finding $Var(X) =$

Let X be a RV and let $a, b \in \mathbb{R}$.

- $E(aX + b) =$
- $Var(aX + b) =$

Discrete Random Variables

For each distribution below, you should know the PMF, CDF (if closed form exists), $E(X)$ and $Var(X)$.

- Bernoulli
- Discrete Uniform
- Binomial
- Geometric
- Hypergeometric (not tested)

- Negative Binomial (not tested)