Department of Mathematics
College of William & Mary

MATH 451/551

Chapter 4. Common Discrete Distributions

4.3 Geometric Distribution

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Geometric Distribution

Geometric Distribution

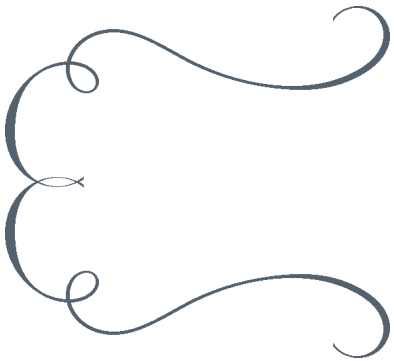
- A geometric random variable X is the number of failures before the first success in repeated independent and identically distributed Bernoulli trials.
- **Support:** $\mathcal{A} = \{0, 1, 2, \ldots\}$.
- **Probability mass function (PMF):**

Bernoulli trial outcomes	x value	$f(x) = P(X = x)$
S	0	p
FS	1	$p(1-p)$
FFS	2	$p(1-p)^2$
FFFS	3	$p(1-p)^3$
$\ldots$	$\ldots$	$\ldots$

- A discrete random variable X with PMF $f(x) = p(1-p)^x, \quad x = 0, 1, 2, \ldots$ for $0 < p < 1$ is a *Geometric*(p) random variable.
- **Shorthand:** $X \sim$ *Geometric*(p) or $X \sim$ *Geo*(p).

CDF

Thank You



THANK YOU!