Name	Situation	PMF $p(x)$	$E(X)$	$V(X)$	Parameters	Possible values
Bernoulli (Indicator)	X is the outcome (success or failure) of one trial *Example:* X is whether or not a student passes an exam.	$p^x(1-p)^{1-x}$	p	$p(1-p)$	$p =$ success probability	$x = 0, 1$
Binomial $\mathcal{B}(n,p)$	X is the number of successes in n independent trials *Example:* X is the number of heads in ten coin tosses.	$\binom{n}{x}p^x(1-p)^{n-x}$	np	$np(1-p)$	$n =$ number of trials $p =$ success probability	$x = 0, 1, \ldots, n$
Hypergeometric $\mathcal{H}(n,M,N)$	X is the number of successes in a sample of size n from a population of size N. *Example:* X is the number of aces in a poker hand.	$\binom{M}{x}\binom{N-M}{n-x}/\binom{N}{n}$	$n\frac{M}{N}$	$\left(\frac{N-n}{N-1}\right)n\frac{M}{N}\left(1-\frac{M}{N}\right)$	$N =$ population size $M =$ number of successes in pop. $n =$ sample size	$x = 0, 1, \ldots$ $\ldots \min\{n, M\}$
Geometric $\mathcal{G}(p)$	X is the number of independent trials until the first success *Example:* X is the number of coin flips until you get the *first* head.	$p(1-p)^{x-1}$	$\frac{1}{p}$	$\frac{1-p}{p^2}$	$p =$ success probability	$x = 1, 2, \ldots$
Negative Binomial $\mathcal{NB}(r,p)$	X is the number of indep. trials until the r^{th} success *Example:* X is the number of coin flips until you get the *third* head.	$\binom{x-1}{r-1}p^r(1-p)^{x-r}$	$r\frac{1}{p}$	$r\frac{(1-p)}{p^2}$	$p =$ success probability $r =$ number of successes	$x = r, r+1, \ldots$
Poisson $\mathcal{P}(\lambda)$	X is the number of times a rare event occurs *Example:* X is the number of accidents at some intersection next week.	$e^{-\lambda}\frac{\lambda^x}{x!}$	λ	λ	$\lambda =$ average rate of occurences	$x = 0, 1, \ldots$