

TABLE OF DISCRETE DISTRIBUTIONS

DISTRIBUTION AND PARAMETERS	DISCRETE DENSITY, OR PROBABILITY FUNCTION, $P(X = x)$	PROBABILITY GENERATING FUNCTION	MEAN	VARIANCE	REMARKS AND EXAMPLES
Discrete uniform distribution on $\{1, 2, \dots, N\}$	$\frac{1}{N}$ $x = 1, 2, \dots, N$				
Binomial $n = 1, 2, 3, \dots$ $0 < p < 1$	$\binom{n}{x} p^x (1-p)^{n-x}$ $x = 0, 1, 2, \dots, n$				
Negative binomial $r = 1, 2, 3, \dots$ $0 < p < 1$ $q = 1 - p$	$\binom{-r}{x} p^r (-q)^x$ $x = 0, 1, 2, \dots$				$(-1)^x \binom{-r}{x} = \binom{x+r-1}{x} = \binom{r}{x}$
Geometric $0 < p < 1$ (Negative binomial, $r = 1$)	$p(1-p)^x$ $x = 0, 1, 2, \dots$				
Alternative geometric $0 < p < 1$	$p(1-p)^{x-1}$ $x = 1, 2, 3, \dots$				
Hypergeometric $N = 1, 2, 3, \dots$ $a = 0, 1, \dots, N$ $n = 0, 1, 2, \dots, N$	$\frac{\binom{a}{x} \binom{N-a}{n-x}}{\binom{N}{n}}$ $x = 0, 1, 2, \dots, n \wedge a \wedge (N-a)$				
Poisson $\lambda > 0$	$e^{-\lambda} \lambda^x / x!$ $x = 0, 1, 2, \dots$				