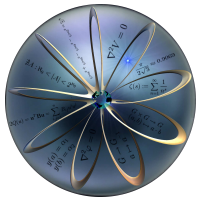

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negative binomial random variable

Canonical name	NegativeBinomialRandomVariable
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Classification	msc 62E15
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Synonym	negative binomial distribution

X is a *negative binomial random variable* with parameters r and p if

$f_X(x) = \binom{r+x-1}{x} p^r (1-p)^x$, $x = \{0, 1, ...\}$

Parameters:

- $r > 0$
- $p \in [0, 1]$

Syntax:

$X \sim NegBin(r, p)$

Notes:

1. If $r \in \mathbb{N}$, X represents the number of failed Bernoulli trials before the rth success. Note that if $r = 1$ the variable is a geometric random variable.
2. $E[X] = r\frac{1-p}{p}$
3. $Var[X] = r\frac{1-p}{p^2}$
4. $M_X(t) = (\frac{p}{1-(1-p)e^t})^r$