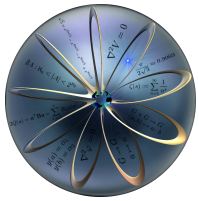

planetmath.org

Math for the people, by the people.

negative hypergeometric random variable, example of

Canonical name	NegativeHypergeometricRandomVariableExampleOf
Date of creation	2013-03-22 12:39:04
Last modified on	2013-03-22 12:39:04
Owner	aparna (103)
Last modified by	aparna (103)
Numerical id	4
Author	aparna (103)
Entry type	Example
Classification	msc 62E15

Suppose you have 7 black marbles and 10 white marbles in a jar. You pull marbles until you have 3 black marbles in your hand. X would represent the number of white marbles in your hand.

- ⋆ The expected value of X would be $E[X] = \frac{Wb}{B+1} = \frac{3(10)}{7+1} = 3.75$
- ⋆ The variance of X would be $Var[X] = \frac{Wb(B-b+1)(W+B+1)}{(B+2)(B+1)^2} = \frac{10(3)(7-3+1)(10+7+1)}{(7+2)(7+1)^2} = 1.875$
- ⋆ The probability of having 3 white marbles would be $f_X(3) = \frac{\binom{3+b-1}{3}\binom{W+B-b-3}{W-3}}{\binom{W+B}{W}} = \frac{\binom{3+3-1}{3}\binom{10+7-3-3}{10-3}}{\binom{10+7}{10}} = 0.1697$