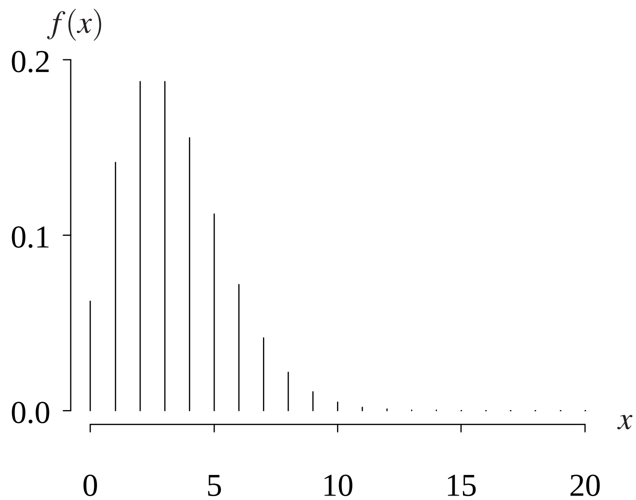
Negative hypergeometric distribution (from http://www.math.wm.edu/~leemis/chart/UDR/UDR.html)
The shorthand $X \sim$ negative hypergeometric(n_1, n_2, n_3) is used to indicate that the random variable X has the negative hypergeometric distribution with parameters n_1, n_2, and n_3. A negative hypergeometric random variable X with parameters n_1, n_2, and n_3 has probability mass function

$$f(x) = \frac{\binom{n_1+x-1}{x}\binom{n_3-n_1+n_2-x-1}{n_2-x}}{\binom{n_3+n_2-1}{n_2}} \qquad x = 0, 1, \ldots, n_2$$

for all $n_1 \in \{1, 2, \ldots, n_2\}$, $n_2, n_3 \in \{1, 2, \ldots\}$. The probability mass function for $n_1 = 5, n_2 = 20$, and $n_3 = 30$ is illustrated below.



The cumulative distribution, survivor function, hazard function, cumulative hazard function, and inverse distribution function, moment generating function, and characteristic function on the support of X are mathematically intractable.

The population mean, and variance of X are

$$E[X] = \frac{n_1 n_2}{n_3} \qquad V[X] = \frac{n_1 n_2 (n_3 + n_2)}{n_3(n_3+1)}\left(1 - \frac{n_1}{n_3}\right)$$

The skewness, and kurtosis of X are mathematically intractable.

APPL verification: The APPL statements

```
assume(0 < n1 < n2);
X := [[x -> binomial(n1 + x - 1, x) * binomial(n3 - n1 + n2 - x - 1, n2 - x)
        / (binomial(n3 + n2 - 1, n2))], [0 .. n2], ["Discrete","PDF"]];
Mean(X);
Variance(X);
Skewness(X);
Kurtosis(X);
MGF(X);
```

return the population mean, variance, skewness, kurtosis, and moment generating function.