

## Binomial Probability Distributions: A Guide

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A binomial probability distribution is a form of discrete probability distribution where there are only two outcomes: success and failure for any given scenario. The distribution must also have a fixed number of trials, the probabilities of success and failure must remain constant throughout the procedure, and the trials must be independent; one trial cannot affect another trial.

For a binomial probability distribution:

- The number of trials is called  $n$ .
- The number of successes in  $n$  trials is called  $x$
- And the probability of success is labeled  $p$ , with its complement being  $q$ . ( $1 - p = q$ )

Parameters for a binomial probability distribution:

- The mean can be found by multiplying the number of trials by the probability of success
  - $\mu = np$
- The standard deviation of a binomial probability distribution is found by taking the square root of the product of  $n$ ,  $p$ , and  $q$ .
  - $\sigma = \sqrt{npq}$

TI-83/84 functions:

Two functions, both of which can be found in [2<sup>nd</sup>] [VARS]

- BinomPDF:
  - This function allows a point estimate of the binomial probability distribution at a given 'x' in 'n' trials with probability of success 'p'.
  - It's arguments are (n,p,x) where x is the exact number of trials of which you want the probability.
- BinomCDF:
  - This function allows for an estimate of the cumulative probability, starting at 0 successes up to x successes of the binomial probability distribution.
  - It's arguments are (n,p,x) where x is the right-most value of which you wish to take the probability.