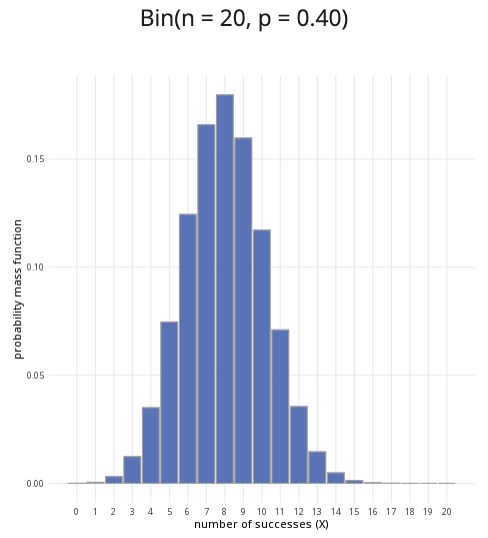
Factsheet: Binomial distribution

Michelle Arnetta and Tom Coleman

Summary

A factsheet on the binomial distribution.



An example of the binomial distribution with and .

**Where to use:** The binomial distribution is used when there are a fixed number of trials () and only two possible outcomes for each trial, representing many Bernoulli trials. Here, the random variable represents the number of successes.

**Notation:** or .

**Parameters:** Two numbers where: - is an integer representing the number of trials, - is a real number representing the probability of success of a trial (where ).

| Quantity | Value | Notes |
| --- | --- | --- |
| **Mean** |  |  |
| **Variance** |  |  |
| **PMF** |  |  |
| **CDF** |  | regularized incomplete beta function, the floor function |

**Example:** You flip a coin times, and the probability of getting ‘heads’ is . Taking ‘heads’ as a success, this can be expressed as , meaning trials are conducted, where the probability of success in each trial is .

# Further reading

This interactive element appears in [Guide: PMFs, PDFs, CDFs](../studyguides/pmfspdfscdfs.qmd) and [Overview: Probability distributions.](../overviews/o-distributions.qmd) Please click the relevant links to go to the guides.

## Version history

v1.0: initial version created 04/25 by tdhc and Michelle Arnetta as part of a University of St Andrews VIP project.

* v1.1: moved to factsheet form and populated with material from [Overview: Probability distributions](../overviews/o-distributions.qmd) by tdhc.

[This work is licensed under CC BY-NC-SA 4.0.](https://creativecommons.org/licenses/by-nc-sa/4.0/?ref=chooser-v1)