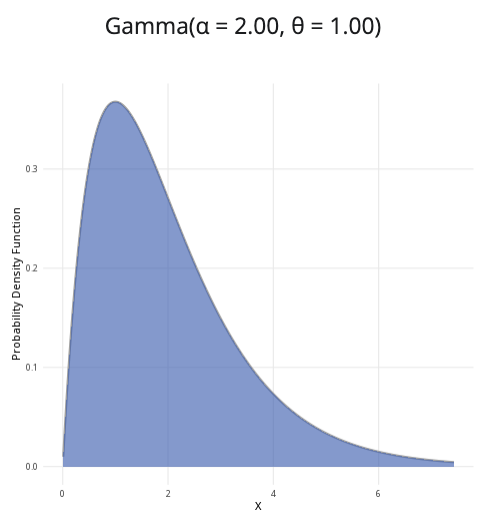
Factsheet: Gamma distribution

Michelle Arnetta and Tom Coleman

Summary

A factsheet for the gamma distribution.



An example of the gamma distribution with and .

**Where to use:** The gamma distribution generalizes the exponential distribution, allowing for greater or lesser variance. It is used to model positive continuous random variables that have skewed distributions.

**Notation:** or

**Parameters:** Two real numbers and , which are related to the mean and variance :

* (shape parameter)
* (scale parameter)

| Quantity | Value | Notes |
| --- | --- | --- |
| **Mean** |  |  |
| **Variance** |  |  |
| **PDF** |  | the gamma function of |
| **CDF** |  | is the PDF of the gamma distribution |

**Example:** You collect historical data on the time to failure of a machine from Cantor’s Confectionery. The mean is 83 days and the variance is 50.3. You can then use this to estimate the shape and scale parameters of the gamma distribution:

The distribution can be expressed as , where the shape parameter is 137 and the scale parameter is 0.61.

# Further reading

[This interactive element appears in Overview: Probability distributions. Please click this link to go to the guide.](../overviews/o-distributions.qmd)

## 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.

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