

How to Plot an Exponential Distribution in R?

Authored by
stats writer

December 7, 2025

RECOMMENDED CITATION

stats writer (2025). *How to Plot an Exponential Distribution in R?*. PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=106628>

There is a probability distribution that is used to model the time we must wait until a certain event occurs.

If a X follows an exponential distribution, then the **probability density function** of X can be written as:

$$f(x; \lambda) = \lambda e^{-\lambda x}$$

where:

λ : the rate parameter

e: A constant roughly equal to 2.718

The **cumulative distribution function** of X can be written as:

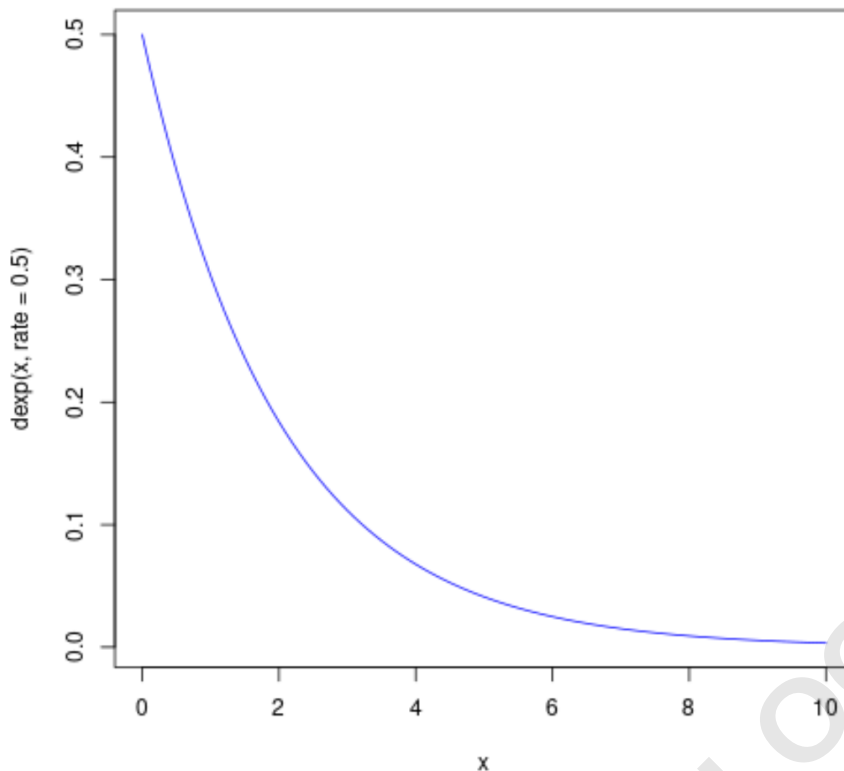
$$F(x; \lambda) = 1 - e^{-\lambda x}$$

This tutorial explains how to plot a PDF and CDF for the exponential distribution in R.

Plotting a Probability Density Function

The following code shows how to plot a PDF of an exponential distribution with rate parameter $\lambda = 0.5$:

```
curve(dexp(x, rate = .5), from=0, to=10, col='blue')
```



The following code shows how to plot multiple PDF's of an exponential distribution with various rate parameters:

#plot PDF curves

```
curve(dexp(x, rate = .5), from=0, to=10, col='blue')
```

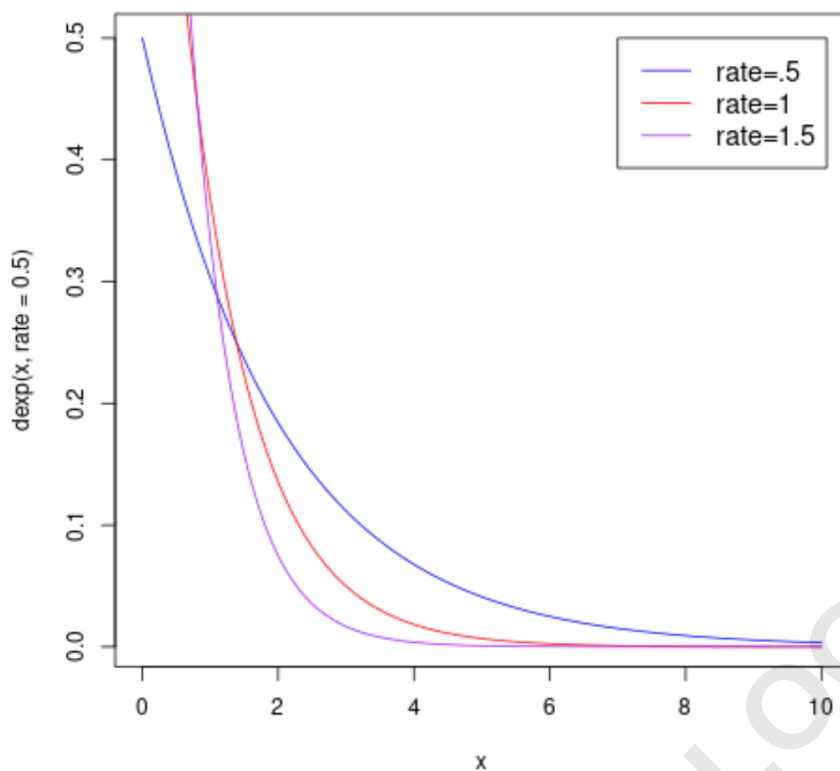
```
curve(dexp(x, rate = 1), from=0, to=10, col='red', add=TRUE)
```

```
curve(dexp(x, rate = 1.5), from=0, to=10, col='purple', add=TRUE)
```

#add legend

```
legend(7, .5, legend=c("rate=.5", "rate=1", "rate=1.5"),
```

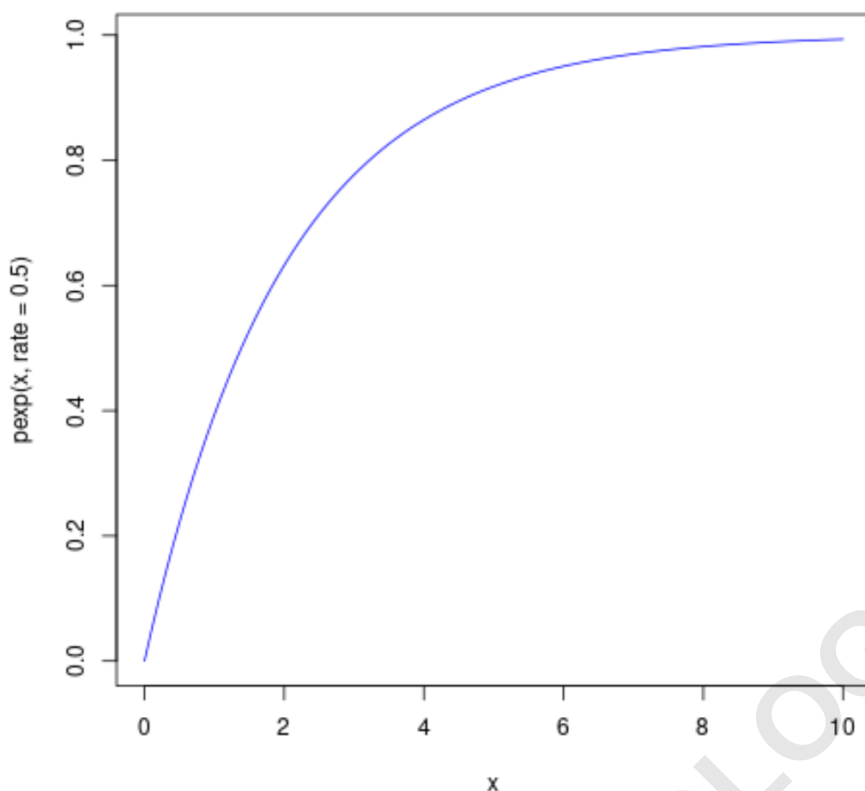
```
col=c("blue", "red", "purple"), lty=1, cex=1.2)
```



Plotting a Cumulative Distribution Function

The following code shows how to plot a CDF of an exponential distribution with rate parameter $\lambda = 0.5$:

```
curve(pexp(x, rate = .5), from=0, to=10, col='blue')
```



The following code shows how to plot multiple CDF's of an exponential distribution with various rate parameters:

#plot CDF curves

```
curve(pexp(x, rate = .5), from=0, to=10, col='blue')
```

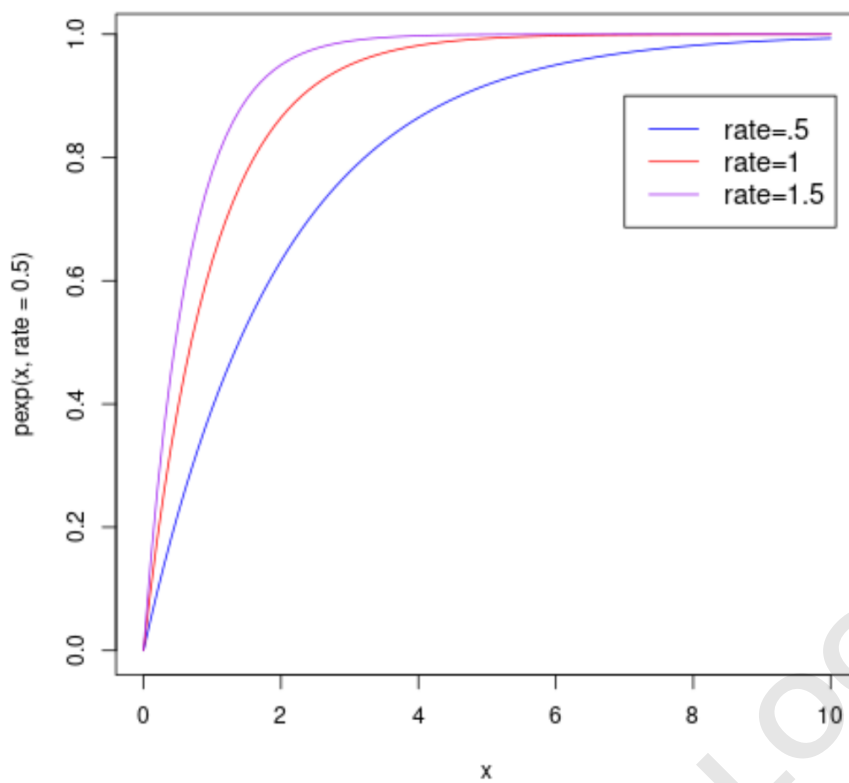
```
curve(pexp(x, rate = 1), from=0, to=10, col='red', add=TRUE)
```

```
curve(pexp(x, rate = 1.5), from=0, to=10, col='purple', add=TRUE)
```

#add legend

```
legend(7, .9, legend=c("rate=.5", "rate=1", "rate=1.5"),
```

```
col=c("blue", "red", "purple"), lty=1, cex=1.2)
```



The following tutorials explain how to plot other probability distributions in R: