Andrew Gard - equitable.equations@gmail.com

The Normal Distribution in R

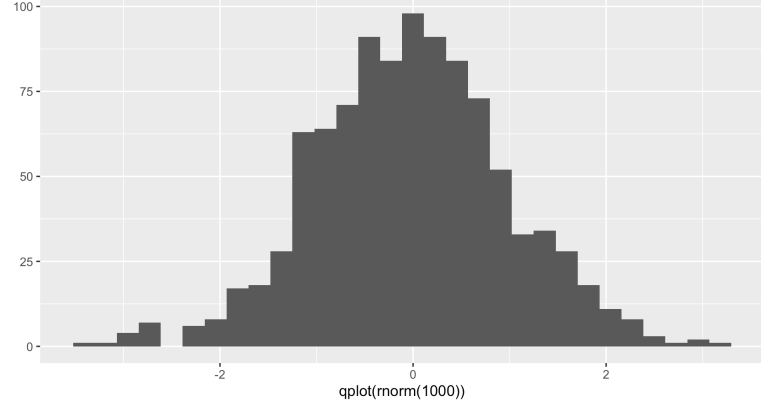
There are 4 basic functions in R for calculating in the normal distribution.

There are 4 basic functions in *R* for calculating in the normal distribution.

- `rnorm(n, μ, σ)` generates n random values from the normal distribution with mean μ and standard deviation σ.

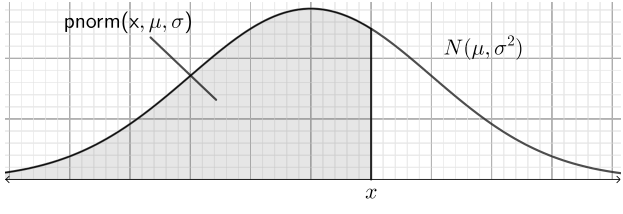
There are 4 basic functions in *R* for calculating in the normal distribution.

- `rnorm(n, μ, σ)` generates n random values from the normal distribution with mean μ and standard deviation σ. If omitted, the parameters default to $\mu = 0$ and $\sigma = 1$.

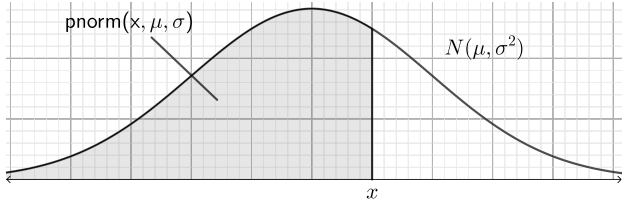


- `pnorm(x, μ, σ)` is the cumulative distribution function of the normal distribution with mean μ and standard deviation σ.

- `pnorm(x, μ, σ)` is the cumulative distribution function of the normal distribution with mean μ and standard deviation σ.



- `pnorm(x, μ, σ)` is the cumulative distribution function of the normal distribution with mean μ and standard deviation σ.



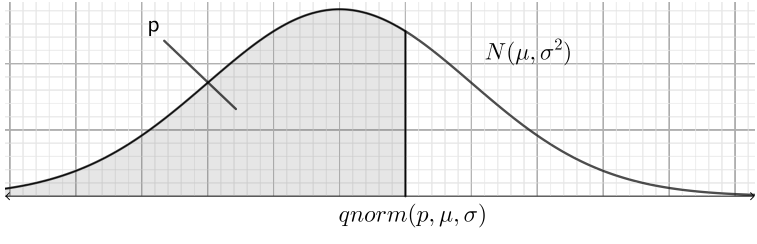
As usual in *R*, *x* can be a vector.

```
pnorm(12:16, 14, .8)
```

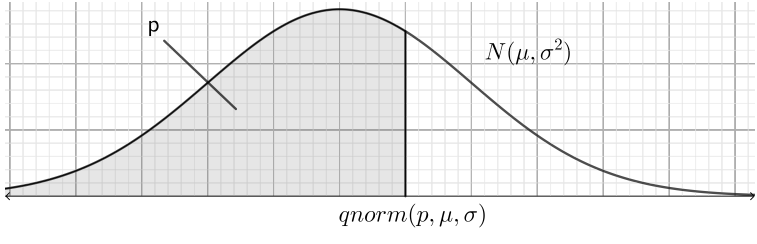
```
## [1] 0.006209665 0.105649774 0.500000000 0.894350226 0.993790335
```

- `qnorm(`p`, `μ`, `σ`)` is the inverse cdf of the normal distribution with mean μ and standard deviation σ. It returns the value x such that `pnorm(`x`, `μ`, `σ`)` $= p$.

- `qnorm(`p`, `μ`, `σ`)` is the inverse cdf of the normal distribution with mean μ and standard deviation σ. It returns the value x such that `pnorm(`x`, `μ`, `σ`)` $= p$.



- `qnorm(`p`, `μ`, `σ`)` is the inverse cdf of the normal distribution with mean μ and standard deviation σ. It returns the value x such that `pnorm(`x`, `μ`, `σ`)` $= p$.

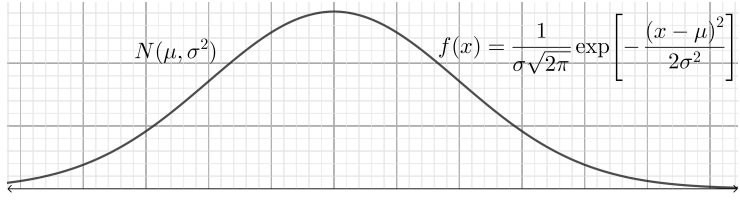


Again, p can be a vector.

```
qnorm(c(.25, .50, .75), 14, .8)
```

```
## [1] 13.46041 14.00000 14.53959
```

- `dnorm(`x`, `μ`, `σ`)` is the probability density function of the normal distribution with mean μ and standard deviation σ.



In *R*, it's generally only used to draw bell curves.

Example. Flipper lengths of a certain kind of penguin are normally distributed with mean 192.9 mm and standard deviation 7.1 mm.

1. What is the probability that a randomly-selected penguin has a flipper less than 200 mm long? More than 200 mm?

2. What is the 90^{th} percentile for flippers length in these penguins?

3. Simulate 500 random selections from this population and plot the results.