Central-Limit-Theorem

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Central Limit Theorem

The central limit theorem states that the sampling distribution of the sample mean approximates the normal distribution, regardless of the distribution of the population from w hich the samples are draw n if the sample size is sufficiently large. This fact enables us to make statistical inferences based on the properties of the normal distribution, even if the sample is draw n from a population that is not normally distributed.

The central limit theorem can be stated as follow s w ith regard to the sample mean: Let x1, ……..xn be a random sample from one population w ith mean μ and variance sigma(square).

```
      x(bar) ~ N(mu, sigma(square)/n)
```

even if the underlying distribution of individual observations in the population is not normal.

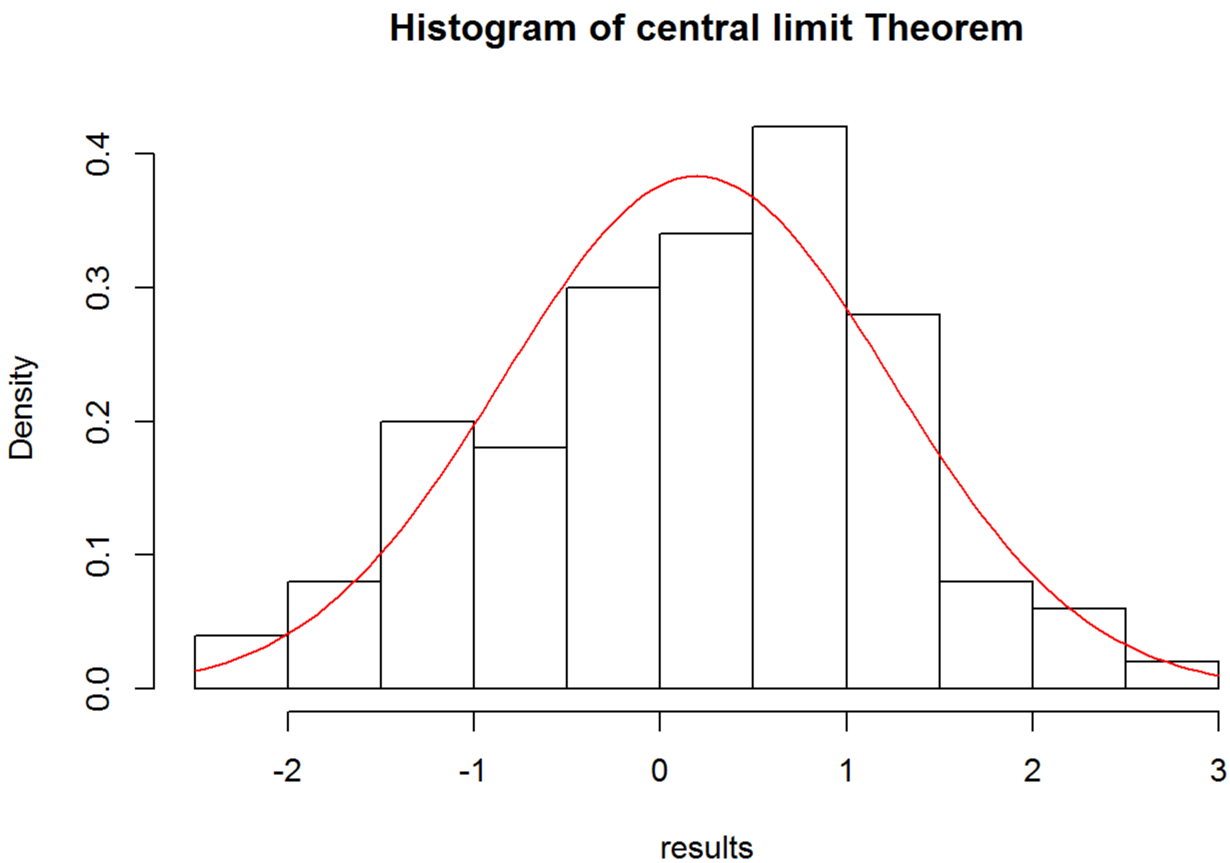
above formula can be w ritten as:

```
     z = (x(bar) - mu)/(sigma/sqrt(n))
```

At first w e create 100 random numbers by using for loop iterates over some specified set of values such as the numbers 1 through 100. w e need them to store the results somew here. This is done using a vector and assigning each of its values one at a time.

```
results = c()
mu = 0
sigma = 1
for(i in 1:100){
  x = rnorm(100, mu, sigma)
  results[i] = (mean(x) - mu)/(sigma/sqrt(100))
}
```

Including plots



Note that the `echo = FALSE` parameter w as added to the code chunk to prevent printing of the R code that generated the plot.