HW 12 Central Limit Theorem

- Definition:

If random samples of size n are drawn from a large or infinite population with mean μ and variance σ^2, then the sampling distribution of the sample mean $\bar{X}$ is approximately normally distributed with mean $\mu_{\bar{X}} = \mu$ and standard deviation $\sigma_{\bar{X}} = \frac{\sigma}{\sqrt{n}}$.

- Prove the CLT. by modify the given R code.
- Describe each line and summarize the results whether they follow the CLT. or not.

Modify this R code

```r
# Central Limit Theorem (CLT) Proof

x.bar=0

popu.x <- rchisq(n=700,df=4)

for(i in 1:3000){
samp.x=sample(popu.x, size=80, replace=TRUE)
x.bar[i]=mean(samp.x)
}

# Population distribution
hist(popu.x)

# Sampling distribution
hist(x.bar)

# Rule1 proof
mean(x.bar)
mean(popu.x)

# Rule2 proof
sd(x.bar)
sd(popu.x)/sqrt(80)

```