STAT 107 – Fall 2020

Central Limit Theorem

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Law of Large Numbers (Law of Averages)

As the sample size n increases, the sample mean $\bar{X}$ "tends to get closer and closer" to the population mean μ.

As the number of trials n increases, the sample proportion of "successes" X/n "tends to get closer and closer" to the probability of "success" p.

Central Limit Theorem

If the sample size n is large, the sampling distribution of the sample total $\sum X$ is approximately normal with mean $n \cdot \mu$ and standard deviation $\sqrt{n} \cdot \sigma$.

If the sample size n is large, the sampling distribution of the sample mean $\bar{X}$ is approximately normal with mean μ and standard deviation $\sigma/\sqrt{n}$.

Case 1: Any population
n is large

Case 2: Normal population
Any n

Case 3: Population NOT Normal
n is small

Example 1:
The weight of an almond varies with mean 0.047 ounce and standard deviation 0.004 ounce.

a) Compute or approximate the probability that the total weight (of a random sample) of 64 almonds is greater than 3 ounces.

b) Compute or approximate the probability that the average weight (of a random sample) of 20 almonds is greater than 0.05 ounces.