

Math 262

Section 4.5

Day 33

1. Simulate 10,000 averages, each of k samples from a $\text{Unif}[0, 1]$ distribution. Make a histogram of the 10,000 averages. Start with $k = 1$ and then try larger values of k . How does the shape of the histogram depend on k ?

Here is some code for making such a histogram in *Mathematica*:

```
averages = Table[ Mean[ RandomVariate[ UniformDistribution[], k ] ], 10000 ]  
Histogram[averages]
```

Here is similar code in R:

```
averages <- replicate( 10000, mean(runif(k)) )  
hist(averages)
```

Sketch the shape of your histograms:

2. Repeat the previous simulation, but now replace $\text{Unif}[0, 1]$ with a different distribution of your choice. What is the shape of the histogram? How does it depend on k ?

3. A farm packs tomatoes in crates. Individual tomatoes have mean weight of 10 ounces and standard deviation of 3 ounces. Estimate the probability that a crate of 40 tomatoes weighs between 380 and 410 ounces.