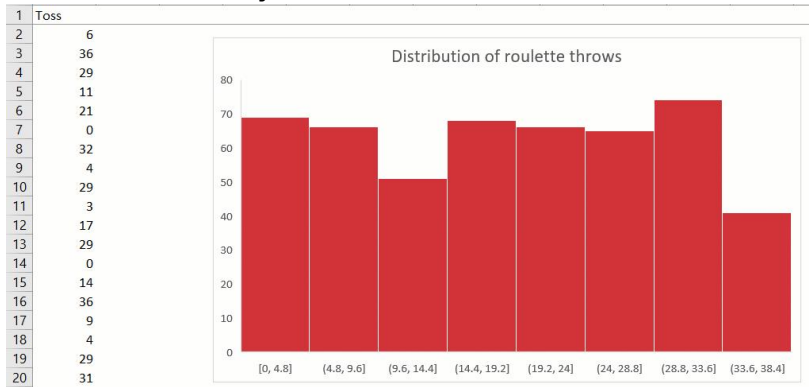


## Central limit theorem in Excel – Demo notes

Demo file: `central-limit-theorem-roulette.xlsx`

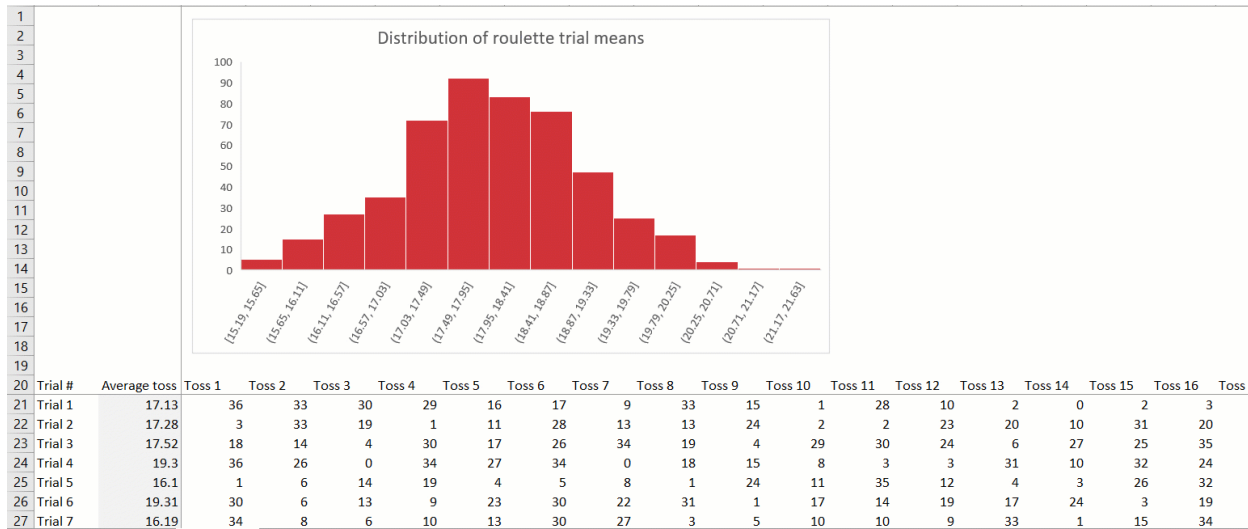
1. Simulate 500 rounds of a roulette spin using `RANDBETWEEN(0,36)`
2. Plot the resulting frequency distribution as a histogram.
3. Use F9 while in your workbook to refresh it.



4. This is a *uniform* distribution.
  - a. It's equally likely to get any number between 0 and 36. This is a type of distribution, but *not* a normal distribution.



5. Now simulate a roulette spin 100 times and take the average spin. Do this 500 times and plot the resulting distribution of *sample* means.



6. This time we get a normal distribution, due to the central limit theorem:
- The central limit theorem tells us that the sampling distribution of the mean of any independent, random variable will be normal or nearly normal *if the sample size is large enough*.
    - Sample size is an important qualifier – the sample means only approach normality with the larger the sample.
    - This theorem is key to *inferential statistics* – while we may not have data for the entire population, we can make probabilistic claims about it given what we know about our sample means when the central limit theorem applies.

