# Compute Statistics from Card Draws

Part One: Card Values from a Single Draw

Description: The following are the statistics generated from an event in which each card in a deck is drawn exactly once (Ace takes a value of 1. Jack, Queen, and King each take a value of 10).

Mean Card Value: 6.54
Median Card Value: 7.00
Standard Deviation of Values: 3.15

Distribution of Single Card Draws
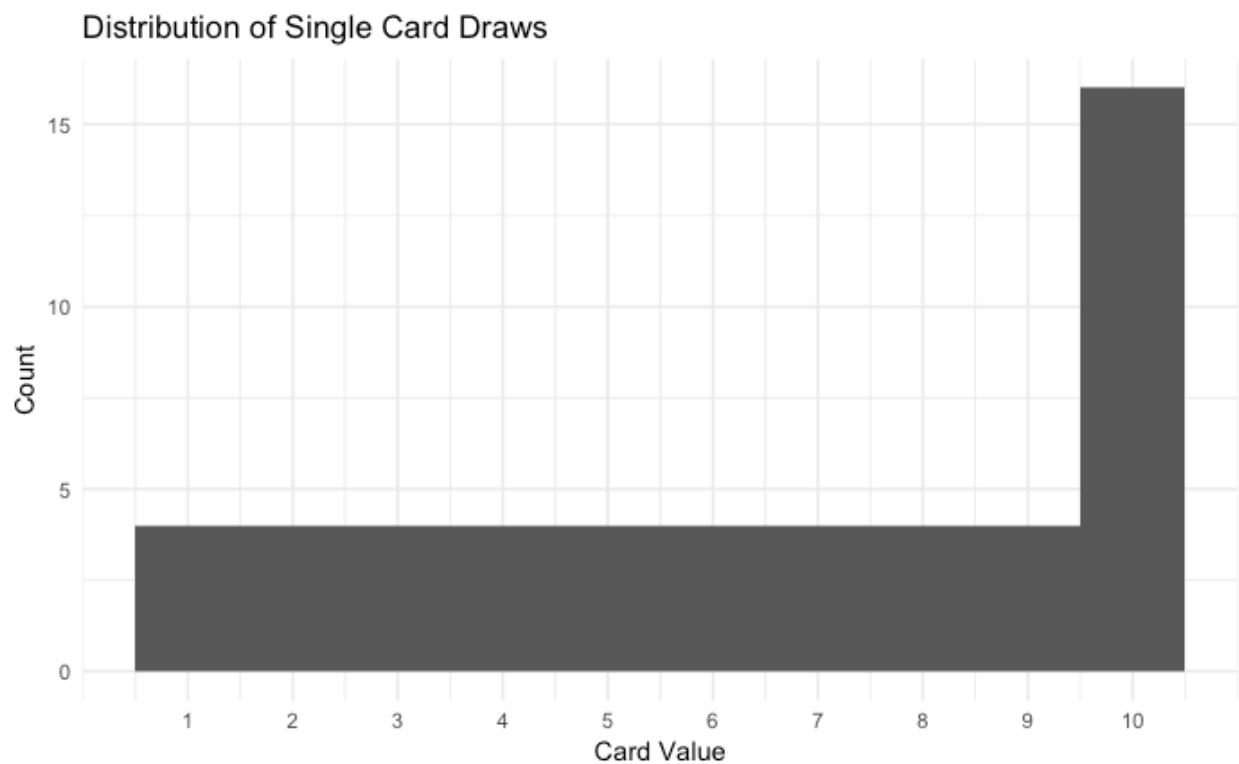
Part Two: Three Card Sums

Description: Data was generated to simulate running thirty trials of drawing three cards randomly without replacement. The values from each of the trials were then summed.
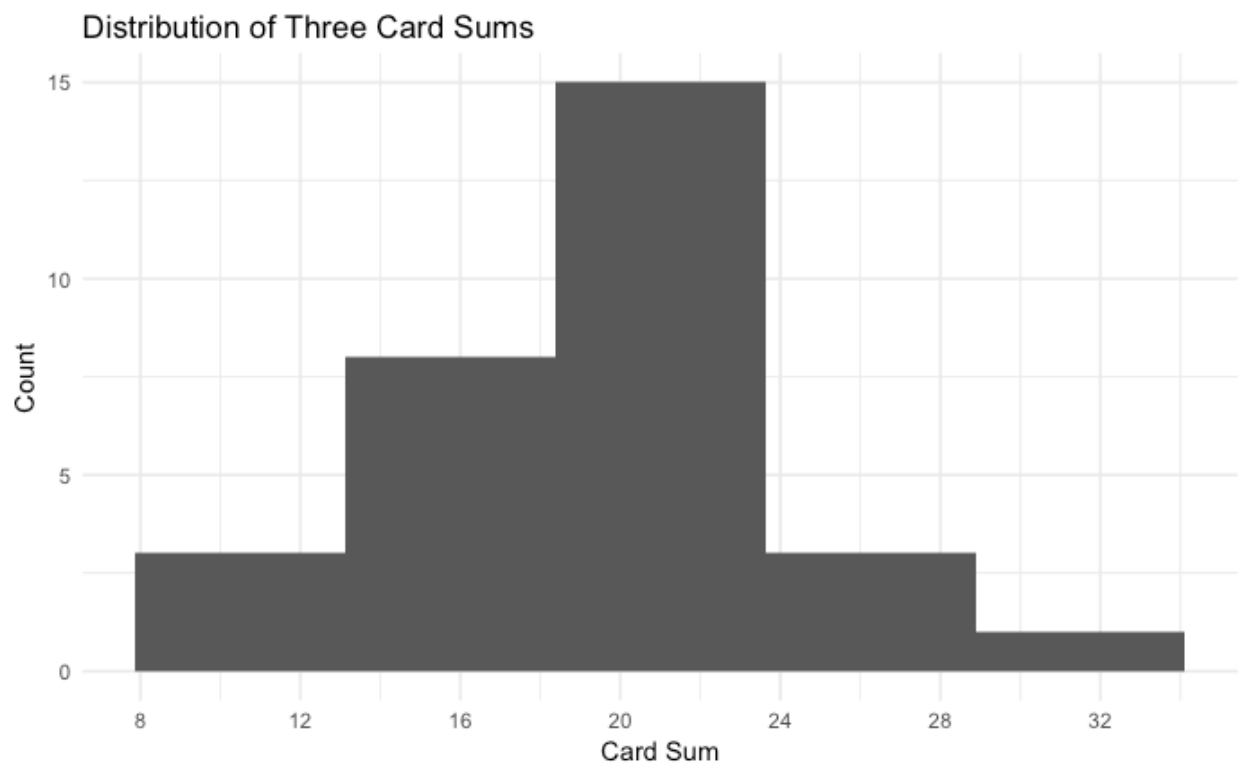
Mean Sum Value: 18.83
Median Sum Value: 19.50
Mode Sum Value: 20
Interquartile Range (Q3 - Q1) of Sums: 5
Standard Deviation of Sums: 4.48

While the previous distribution was highly skewed, this distribution looks normal. This is due to the central limit theorem, which states that even if a single sample is not distributed normally, the sum of samples will tend towards normality.

<u>Predictions:</u>

About 90% of the sums will fall in the range of 11-26. To find the 90% range, I reasoned that 5% of the data at each tail end of the distribution will not fall into this range. This means that there is a 0.05 probability of data falling into the tail ends. The Z table shows that a Z-score of -1.645 will account for a probability of 0.05. This means that the value at one tail end can be obtained by subtracting 1.645 times the standard deviation (4.48) from the mean. The value at the other tail end can be obtained by adding 1.645 times 4.48 to the mean. These numbers, after rounding, ended up being 11 and 26.

The approximate probability of getting a draw of at least 20 is 0.4. This probability was obtained by finding the Z-score of 20, which is 0.26 (calculated by subtracting the mean from 20 and dividing that difference by the standard deviation). That Z-score corresponds to a value of 0.6026 on the Z table. Since this is the probability of a score less than 20, 1 - 0.6026, or 0.3974 (rounded to 0.4), would be the probability of getting a score of at least 20.