Analyzing a Deck of Cards

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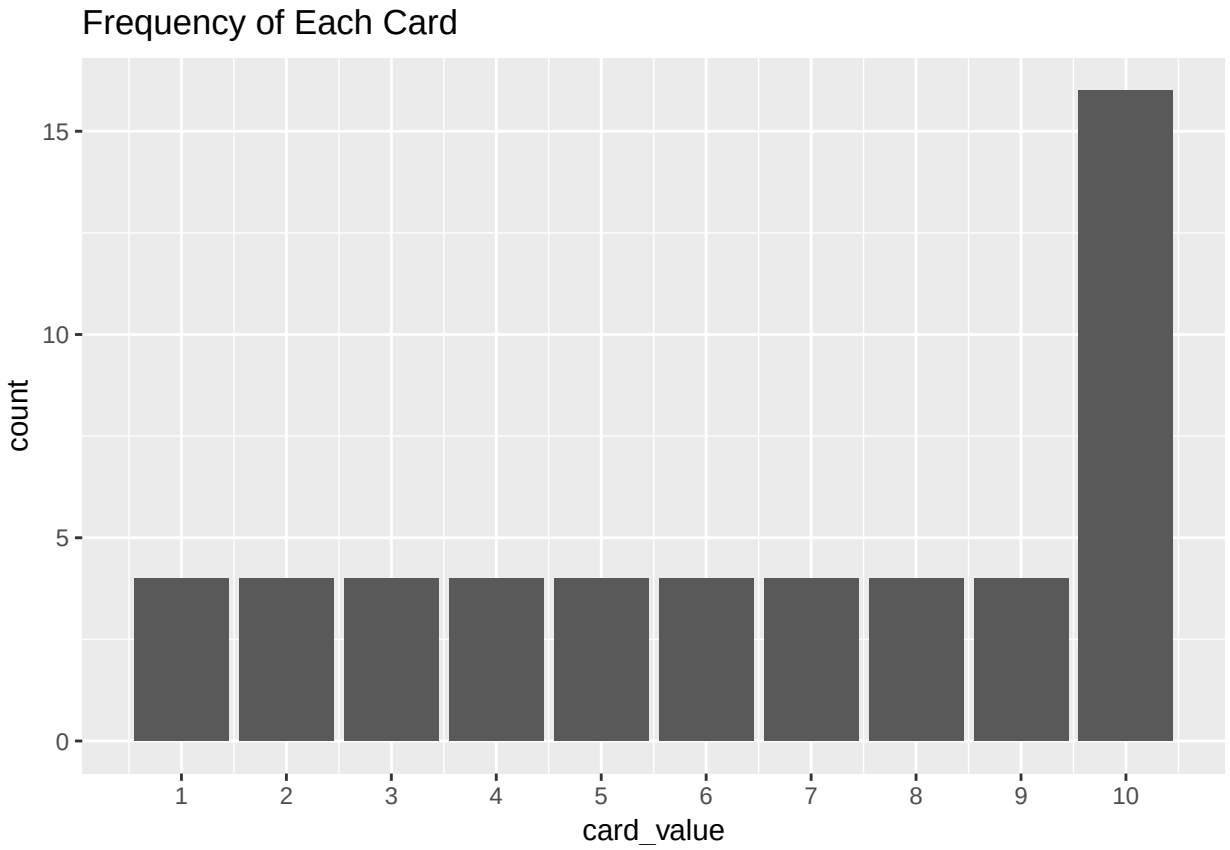
5/23/2017



For the above frequencies, an Ace has a value of 1 and picture cards have a value of 10.

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## [1] "The mean is: 6.54"
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## [1] "The median is: 7"
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## [1] "The standard deviation is: 3.15"
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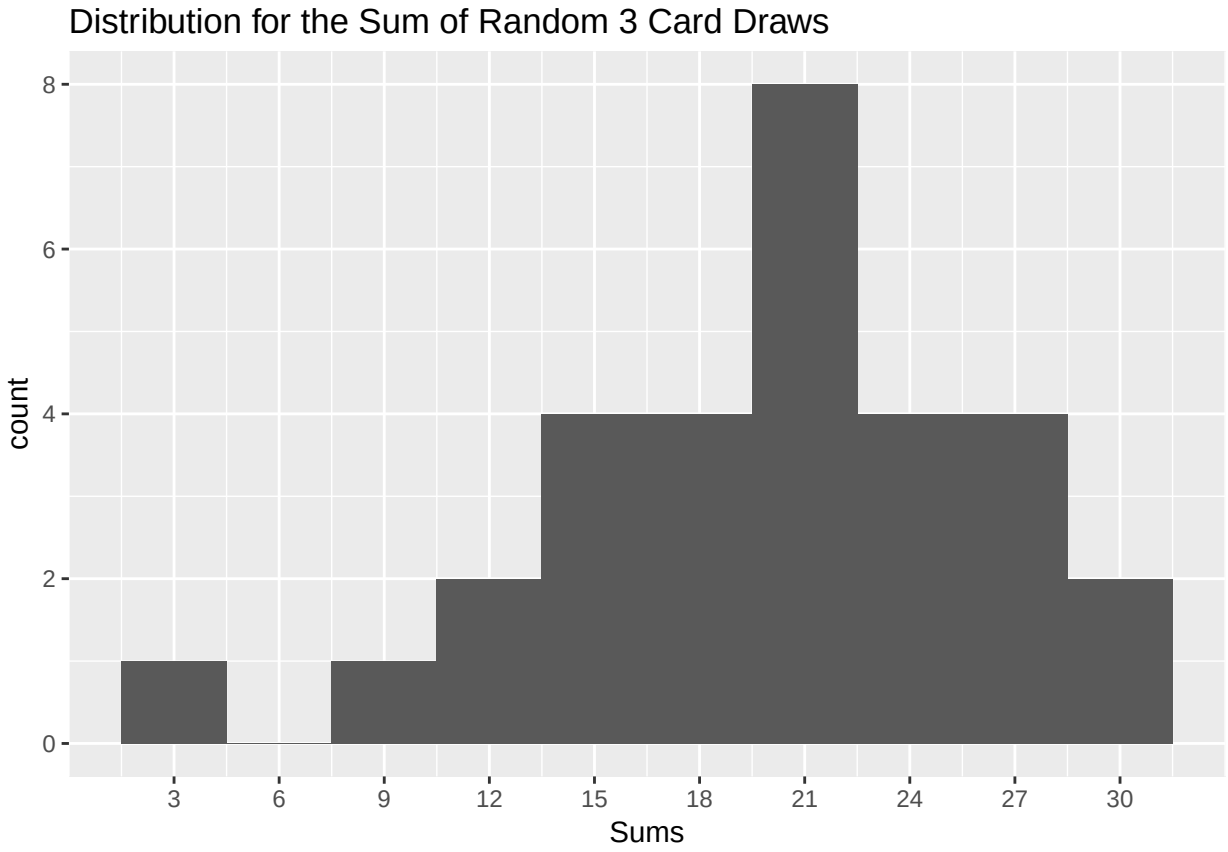

The distribution of sample draws takes on a normal distribution that is different from the shape of the original data. This is to be expected as it conforms to the Central Limit Theorem (CLT). Also from the CLT we would expect the mean of all samples from the population to be approximately equal to the mean of the population. As shown below, the mean of the samples is only slightly higher at 6.68 (20.03 / 3) versus the actual population of 6.54.

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## [1] "The mean of sample sums is: 20.03"
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## [1] "The median of sample sums is: 20"
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## [1] "The variance is: 37.27"
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## [1] "The standard deviation is: 6.11"
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## [1] "The range of sample sums is: 26"
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## [1] "The interquartile range is: 9"
```

Based on the Central Limit Theorem, it would be expected that each 3 card draw in the future would sum to just under 20. Further, we can expect that 90% of the future draws have a sum that is +/- 10.05 from the mean of the deck, (i.e. between 9.98 and 30.08). The value of 10.05 is derived by multiplying the standard error by 1.645. Note that 30.08 is actually above the maximum possible score of 30.

If we wanted to know the probability of getting a value of at least 20, we would first find that this value is approximately 0.06 standard deviations from the mean ((20-20.03) / 6.11). This results in a probabiliy of 50.2% that the sum will be at least 20.