Pokémon Mulligan

For this part of the project, we were tasked with making a Pokémon trading card game's mulligan mechanic, essentially, in which players must redraw their hand if it is empty of a playable Pokémon card. To determine the probability of having to mulligan, which is not having a playable Pokémon card, the simulation performs 10,000 trials for every deck size, ranging from 1 to 60 Pokémon cards. The more runs we could have, the more accurate the graph or numbers could be, but we set on 10,000 runs, which is a big sample set. Pokémon, Energy, and Trainer cards were imported to make up each deck. The deck is shuffled before a hand of seven cards is drawn or dealt. Like I stated earlier, a mulligan is when we don’t have a playable Pokémon card, aka a Charizard or Pikachu for example. The software then determines the mulligan chance as the proportion of mulligan occurrences in the 10,000 simulations for every deck size.

I went a little step further and had the results be saved to a CSV file with two columns: one for the mulligan chance percentage and another for the quantity of Pokémon cards in the deck. Below is a chart that illustrates how deck size affects the likelihood of receiving a mulligan. The mulligan likelihood is particularly high when there aren't many Pokémon cards in the deck, as you can see. Meaning that there's a higher risk that the player won't draw a Pokémon card and will have to mulligan. The mulligan chance, however, decreases dramatically with the number of Pokémon cards added, reaching nearly zero when the deck size reaches about 60 Pokémon cards. This checks out with my beginning synopsis at the start of creating this, as it only makes sense when the deck size increases.

