

**Take Home Quiz 3**

Play 30 games of the “Game of 10.” Using the data sheet of the back this page, record your games. In the “Sum2” column write the total of the first two dice rolled. In the total column write the sum of all the dice if you did not bust (go over 10). If you busted, write “bust.” In the winner column, write “F” “S” or “T” depending upon whether the first or second player won the game (T is for tie). In the tables below the scoring sheet

1. Generate a frequency distribution of the sum of the pairs of dice Sum2.
2. Generate a frequency distribution of the number of roles before busting.
3. Measure the percent of times the second player won.(ignore ties)
4. Measure the percent of times someone busted.
5. Measure the percent of times someone got exactly ten.

**Dice “Game of 10” Rules**

Number of players: Two

Number of dice: One

Object: To reach the closest total count to ten without going over (busting).

Rules: Roll die to determine who is first. After first time alternate first. Each player rolls one die at a time. The number of dots on each roll is added to the previous total. The player continues to roll until he chooses to stop or exceeds 10 (goes bust). If the first player busts, the second player automatically wins.

**Answer the following questions**

1. Draw the theoretical distribution for the sum of two die and compare it to the one you experimentally generated. Are there any noticeable differences? Explain.
2. What is the maximum number of rolls possible without busting? How did this compare to your experimental frequency distribution? What was the average number of rolls? What was the mean and standard deviation of the number of rolls?
3. What is the minimum number of rolls?
4. What is the optimal strategy for the first player with totals of, 6, 7, 8 - should you roll or “stand pat?”
5. How is your strategy affected by what has gone on before you?
6. Is it more advantageous to be first or last? How does your answer compare to the percent of times the second player won?
7. Given that first player has nine, what is the theoretical probability of winning? How does this compare to the percent of times that someone got exactly ten? What is the average number of rolls to get ten?
8. What is the theoretical expected number of rolls to get exactly ten given that you got ten?

**You can do this problem with your math buddy and  
submit ONE combined set of answers or  
you can play the game with a friend and submit your own answers.**