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**Elementary Statistics** 

Period \_\_\_\_\_

## Chapter 4 & 5 Probability Project

First, create a SIMPLE game using a discrete random variable. For example: rolling a fair die, choosing a number from a standard deck of playing cards, or using a spinner to select a number (or any combination of those).

Please note: Your game must have at least 10 different possible outcomes and each outcome must be a discrete random variable (countable and numerical). If necessary, round final answers to 3 significant digits.

1. Describe how to play the game. (2 pts)

2. Make a sample space of the possible outcomes. (3 pts)

3. Create a probability distribution for all possible outcomes. (4 pts)

4. Use the probability distribution to create a probability histogram. (4 pts)

- 5. Find the mean of the discrete probability distribution. (3 pts)
- 6. Find the variance of the discrete probability distribution. (3 pts)
- 7. Find the standard deviation of the discrete probability distribution. (3 pts)
- 8. Decide which outcome will "win." (2 pts)

9. What is the theoretical probability of winning? (2 pts)

10. What is the theoretical probability of losing? (2 pts)

Have 4 people play your game three times and record the results. (4 pts)

Person #1: A classmate

Name: \_\_\_\_\_

Outcome #1	
Outcome #2	
Outcome #3	

Person #2: A friend

Name: \_\_\_\_\_

Outcome #1	
Outcome #2	
Outcome #3	

Person #3: A teacher

Name: \_\_\_\_\_

Outcome #1	
Outcome #2	
Outcome #3	

## Person #4: A family member

Name: \_\_\_\_\_

Outcome #1	
Outcome #2	
Outcome #3	

Find the following empirical (classical) probabilities out of the 12 total trials:

11. What was the empirical probability of winning? (2 pts)

12. What was the empirical probability of the complement of winning? (2 pts)

13. What was the empirical probability that either the teacher OR the family member won? (3 pts)

14. What was the empirical probability that both the classmate AND the friend won? (3 pts)

15. What was the empirical probability that the teacher won GIVEN that the classmate won? (4 pts)

Assume this game fits the criteria for a binomial probability distribution where 12 is the fixed number of trials, and the two possible outcomes are winning (success) and losing (failure).

16. What is the probability of success (p)? (2 pts)

17. What is the probability of failure (q)? (2 pts)

18. Find the mean of the binomial probability distribution. (3 pts)

19. Find the standard deviation of the binomial probability distribution. (3 pts)

20. How many times did the family member win? \_\_\_\_\_

Would this number of wins be considered unusual using the range rule of thumb? (4 pts)