Classroom Activity 4 Math 113 Name : _____
10 pts Intro to Applied Stats

Materials Needed:

Deck of playing cards. There needs to be two people per group.

Does card counting help improve guessing the next card that will be dealt?

For questions 1 and 2, the person dealing the cards should record the results on the paper belonging to the person guessing the cards. In this way, each person will then work with their own data.

1. One person should thoroughly shuffle and cut the deck. The other person will try to guess whether the card on top is a club, diamond, heart, or spade. After the second person guesses, the first person will lift the card and see if card was guessed correctly. That person should record the results in the table below but not let the guesser know whether or not they were correct. Repeat this process until the first twenty cards in the deck have been guessed. Again, do not let the guesser know whether they were correct or not, either by showing them the card or letting them see the results of the table.

Blind guessing: Record the guess in the first row and the actual card in the second row. Abbreviate the suite by its first letter: C=Clubs, D=Diamonds, H=Hearts, S=Spades.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

2. Shuffle and cut the deck again. Repeat the same process as above, except briefly show the guesser the card to let them know if they were right after guessing. Then place the card face down so that they cannot see the cards. The person guessing should try to guess based on what cards they have seen dealt.

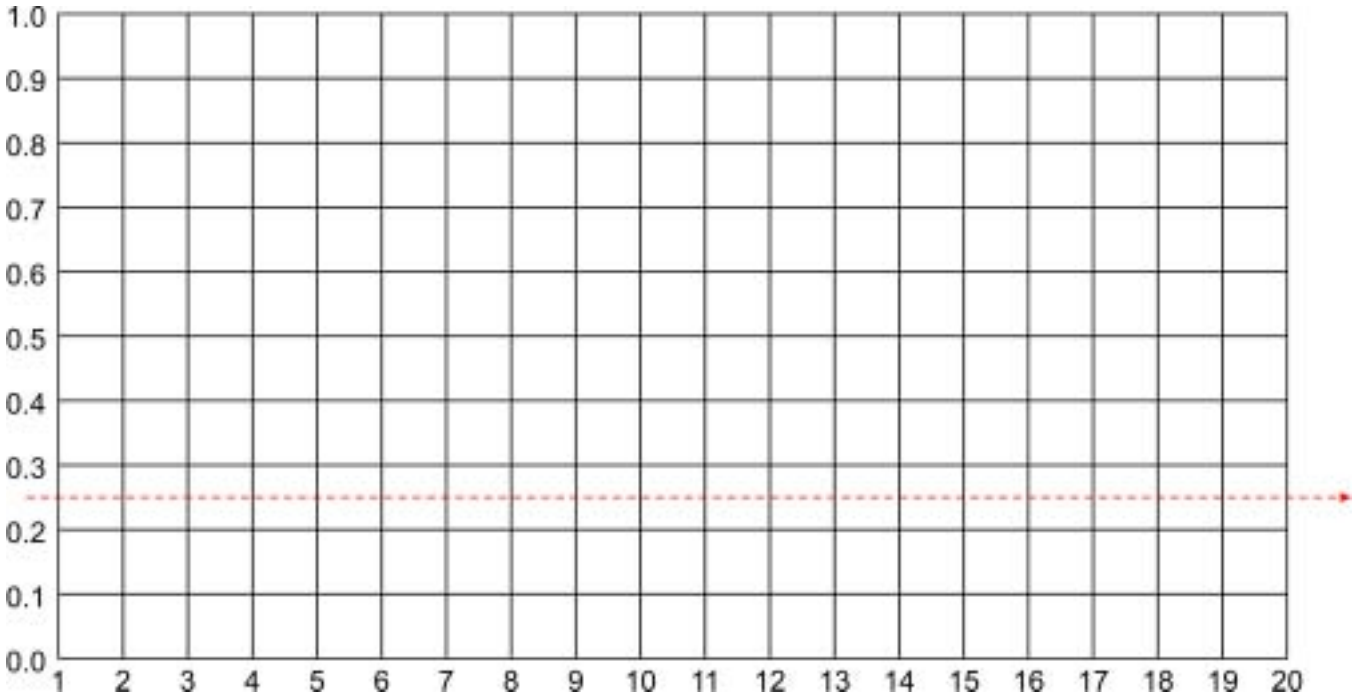
Card counting: Record the guess in the first row and the actual card in the second row. Abbreviate the suite by its first letter: C=Clubs, D=Diamonds, H=Hearts, S=Spades.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

3. Describe the who, what, where, when, why, and how of the data.

4. If the purpose is determine whether card counting helps the guesser, explain why we did the first experiment where the user wasn't shown the card dealt.

5. Using only your data, make two time series plots of the cumulative probability of guessing correctly vs the card dealt. Place both time series plots on the same grid, preferably with different colors, and be sure to label them.



6. Consider your results from question 1 where you weren't able to see the cards to know if you were correct in your guess.

   a. What percent of the time did you guess the suite correctly?

   b. Is this close to the 25% of the time you would expect to guess correctly?

7. Now consider your results from question 2 where you were able to see the cards to know if your guess was correct and also which cards had been used.

   a. What percent of the time did you guess the suite correctly?

   b. Is this better than you did the first time when you couldn't see the cards?

8. Now we'll see if you significantly better by running a statistical test on the results. Perform a comparison of two proportions to see if the results of question 2 are higher than the results on question 1.

   a. Write down the confidence interval for the difference in your percents.

   b. Does this interval contain the value 0 (which would mean there is no difference)? If so, you didn't do better the second time around.

   c. What is the p-value for your data? The p-value is the probability of getting your results if there is no difference in the two samples. A small p-value (less than 5% or 0.05) means that your results are unusual if there is no difference, so we say there is a difference.

   d. Use the explanations in part b) and c) to answer this question. Statistically speaking, does it appear that you did better when you could see the cards?

9. Minitab gave you a warning about the results may be inaccurate for small samples. This is true. You only have a sample size of twenty, which is pretty small for something like this. Collect the data from the rest of the class and then we'll use it for the rest of this activity.

In the table below, write the name of the person in the first row and then the number they guessed correctly for the both experiments in the cell below that. Write the both numbers in the same cell of the table: For example "4 / 6" would mean they got 4 right the first time and 6 right the second time. Start off with your data in the first cell.

Name								
Right								
Name								
Right								
Name								
Right								

10. Summarize the results of the number correct for the class.

Number of cards guessed correctly

	Experiment 1	**Experiment 2**
Sample Size		
Mean		
St. Dev.		

11. Which experiment had better results? Which statistic are you looking at to determine this?

12. Which experiment had more consistent results? Which statistic are you looking at to determine this?

13. Find the total number correct for the entire class for both experiments.

    a. Experiment 1: Without seeing cards dealt

        i. Total number of trials = _____

        ii. Total number of successes = _____

        iii. Percent of correct guesses = _____

        iv. Is the percent correct close to 25%?

    b. Experiment 2: Seeing the cards dealt

        i. Total number of trials = _____

        ii. Total number of successes = _____

        iii. Percent of correct guesses = _____

14. Re-run the comparison of two proportions.

    a. Write the confidence interval for the difference of the proportions.

    b. What is the p-value?

    c. Using the same explanations as in question 8, does it appear that, as a whole, the class did better when they were able to see the cards?