Stat 1350, Probability Activity, Fall 2014 Name KEY

Instructions: This activity will be conducted using a set of ordinary playing cards. Your instructor will provide them.

1. Choose a combination of two cards you would like to experimentally determine the probability for. For instance, a pair of 2s, or Jack-Queen combination, or two spades, for instance. The choice is yours. You may choose a three-card combination, if you want, but if you choose something too unlikely, this exercise will feel like a waste of time (you will have to adjust the probabilities below accordingly for three instead of two). State your selection here.

   2 face cards

2. Find the probability of the event you choose by calculating the probability of the first card you chose, times the probability of the second card you choose (given that you don't put the first card back in the deck), then multiply the result by two (in order to account for the fact that it doesn't matter which card comes first—if you are using three cards, ask your instructor about your example: the multiplier may not be three and could depend on your specific choice).

   12 face cards

   multiply by 2 if cards are different types

   $\frac{12}{52} \cdot \frac{11}{51} = .0497737557$

3. You will need to take 100 samples. Shuffle your deck of cards, and choose two cards. Record below whether the pair (or set of three) matches your selection from #1. If it does match, put a tally in the Success column. If it does not match, put a tally in the Failure column. Shuffle your deck of cards frequently (ideally, between each selection).

Success	Failure
III	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 II 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸

4. Total up your tallies in each category. Divide the number of tallies in the success column with the probability you calculated in #2. How does it compare?

$\frac{3}{100} = .03$

Since the margin of error for this sample size is 10% ($\frac{1}{\sqrt{100}} = .1$) this is as close as we can expect.

5. Given your chosen pair in #1, what is the sample space for the probability event? List them here. What is the probability for each event in the sample space?

$\{F,F\} = \frac{12}{52} \cdot \frac{11}{51} = .0497737557$

$\{F,N\} = \frac{12}{52} \cdot \frac{40}{51} + \frac{40}{52} \cdot \frac{12}{51} = .3619909502$

$\{N,N\} = \frac{40}{52} \cdot \frac{39}{51} = .5882352941$