Staple

															,											
															,											
L	A	S	T		N	A	M	E							,	F	I	R	S	T		N	A	M	E	

2017 - 2018 Spring Semester MATH 3050 Section 101 (Barsamian) Revised H9, Due Wed Apr 18, 2018

Problem:	1	2	3	4	5	6	7	Total	Rescaled
Your Score:									
Possible:	10	10	10	20	20	10	20	100	20

[1] (Similar to book Example 9.1.1 and suggested exercises 9.1 #3,5)

A card is drawn at random from a standard 52-card deck.

(A) Draw the sample space S (note that this is not done in the book.) and find $N(S)$.

(B) Define E to be the event that the drawn card is red and has an odd number on it. Illustrate E on your drawing of the sample space, find $N(E)$, and find $P(E)$.

[2] (Similar to book Example 9.1.2 and suggested exercises 9.1 #7,9)

A pair of standard dice is rolled. One die is red; the other, white

(A) Draw the sample space S using a table (easier than the drawing done in the book example) and find $N(S)$.

(B) Define E to be the event that the sum of the numbers is at least 8. Illustrate E on your drawing of the sample space, find $N(E)$, and find $P(E)$.

[3] (Similar to book suggested exercise 9.1 #18)

An urn contains three green balls (denoted G_1, G_2, G_3) and two red balls (denoted R_1, R_2).

One ball is drawn and its color is recorded, and it is replaced in the urn.

Then another ball is drawn and its color is recorded.

(A) Illustrate the experiment two ways: Draw the sample space S using a table, and also construct a possibility tree showing all the possible outcomes. Find $N(S)$.

(B) Define E to be the event that first ball drawn is green. Illustrate E on your table, find $N(E)$ and $P(E)$.

(C) Define F to be the event that both balls drawn are green. Illustrate F on your tree, find $N(F)$ and $P(F)$.

[4] (Similar to previous problem)

Same urns, same balls as in previous problem, but this time the first ball is not put back into the urn before the second ball is drawn. Answer questions (A),(B),(C) from problem [3] in this new situation. (Make new illustrations.)

(Hint: the key is to realize that the new illustrations can be made by making small changes to the old ones.)

[5] (Similar to book Example 9.1.3 and suggested exercise 9.1 #20, but using Section 9.2 tree technique)

Analyze the *Monty Hall Problem* but with n doors, instead of 3 doors. That is, there are n doors, one that has a prize and the remaining doors empty. (I'll tell you which value of n to use below.) The contestant chooses a door. The host does not open that door, but opens one of the remaining doors. The host always chooses to open one of the remaining doors that is empty. At this point, the contestant has the option of staying with their original choice of door, or switching to a new choice. (Of course, the contestant would not choose the door that the host has opened, because the contestant now knows that that door is empty.)

Define two strategies that the contestant can use:

- The *Stay Strategy* is to stay with the original choice of door.
- The *Switch Strategy* is to switch doors.

Here are your assignments

- Ryan, Ashley, Noah, Matthew: Use $n = 6$.
- Devon, Ben, Alyssa, Blue: Use $n = 5$.
- Kristen, Peter, Jalen, Alexandria, Allison: Use $n = 4$.

(A) Using your assigned value of n, make a possibility tree for the *Stay Strategy* and find $N(Stay)$.

(B) Define $WinStay$ to be the event that the contestant wins using the *Stay Strategy*. Illustrate $WinStay$ on your tree, find $N(WinStay)$ and $P(WinStay)$.

(C) Start over: Using your assigned value of n, make a possibility tree for the *Switch Strategy* and find $N(Switch)$.

(D) Define $WinSwitch$ to be the event that the contestant wins using the *Switch Strategy*. Illustrate $WinSwitch$ on your tree, find $N(WinSwitch)$ and $P(WinSwitch)$.

[6] (Similar to book suggested exercise 9.2#6,7)

An urn contains three green balls (denoted G_1, G_2, G_3) and one red ball (denoted R_1).

A second urn contains two green balls (denoted G_4, G_5) and two red balls (denoted R_2, R_3).

An experiment is performed in which one of the two urns is chosen at random and then two balls are randomly chosen from it, one after the other, without replacement.

(A) Construct a possibility tree showing all the possible outcomes. Find $N(S)$.

(B) Define E to be the event that two green balls are chosen. Illustrate E on your table, find $N(E)$ and $P(E)$.

[7] (Similar to book Example 9.2.1 and suggested exercises 9.2#1,3)

(A) How many ways can a Best 3 of 5 Contest be played? Draw a possibility tree to illustrate.

(B) In a Best 3 of 5 Contest, what is the probability that the team that loses the first game will go on to win the contest? (Explain using your possibility tree.)

(C) How many ways can a Best 3 of 5 Contest be played if no team wins three games in a row? Draw a new possibility tree to illustrate.