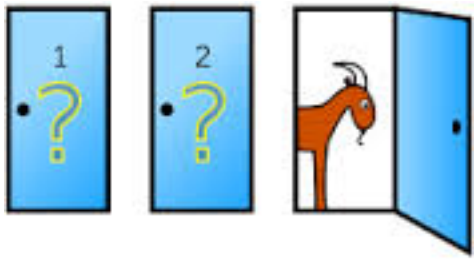
Law of Large Numbers **Name**_____

The Law of Large Numbers (paraphrased)
The average of the results obtained from a large number of trials of an experiment will be close to the theoretical average and will tend to become ever closer as more trials are performed.

Jacob Bernoulli (1654 - 1705), a Swiss mathematician, was the first to describe a law now known as the Law of LargeNumbers.

Monty Hall Problem

We will test the law of large numbers by simulating this game.



In the gameshow, Let's Make a Deal, Monty Hall played a game with his contestants in which behind one of 3 closed doors was a new car, behind a second was a lesser appealing prize, and behind a third was a goat. The contestant would be asked to choose one door, but before revealing what was behind this door, Monty would reveal one of the doors that did not lead to the grand prize, a car. Should the contestant stay with the original choice or switch to the remaining closed door?

Game Show Host

Find a partner in the classroom and select one of you to be the game show host and the other to be the contestant. The game show host will keep this paper hidden from the contestant. The host will write in 10 game scenarios below. For example,

Game 1: Door 1 = Car; Door 2 = steak knives; Door 3 = goat.

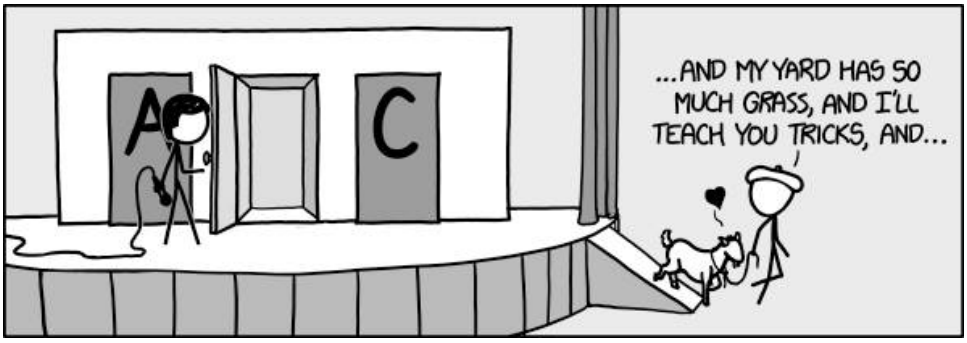
Use the sheet to play the 10 games with your partner. Record the results on the next page.

Game	**Door 1**	**Door 2**	**Door 3**
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Record the results of your ten trials here.

Game	Switched		Stayed	
	Won	Lost	Won	Lost
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
Totals:				

To see this game simulated a very large number of times, visit
http://www.grand-illusions.com/simulator/montysim.htm



After all trials have been completed, we will collect class data here:

Group Totals	Switched		Stayed	
	Won	Lost	Won	Lost
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
Totals:				

Is is better to switch or stay?	
f_1 = number of games won when contestant switched n_1 = number of games played when contestant switched A = the event that a contestant switched and won	f_2 = number of games won when contestant stayed n_2 = number of games played when contestant stayed B = the event that a contestant stayed and won
$P(A) = \frac{f_1}{n_1} =$ _____	$P(B) = \frac{f_2}{n_2} =$ _____