



Probability Project

Chuck-a-Luck

Problem Scenario: The game of Chuck-a-Luck is an old carnival game which we wish to analyze in this activity. You'll have an opportunity to simulate the game and delve into its mathematics. The game is simple enough.



The "player" simply chooses a number from 1 to 6 and bets on it. Three dice are rolled and if the chosen number appears on one die, the player gets his/her money back plus the same amount. If two dice show the chosen number, then the player gets his/her original money back plus twice the amount. Finally, if all three dice show the chosen number then the player gets his/her original amount plus three times the amount. For example, if I bet \$1 on the number 5, and after the roll of the three dice two 5's show heads-up, I get my \$1 back plus \$2 more. It is pretty simple to play and to simulate in a classroom. Here are your tasks.

Procedure:

1. Please rearrange yourselves at your tables as necessary so there are 8 people at each table and create partners so there can be 4 simultaneous instances of the game at each table.
2. Select one person in the partnership to be the carnival employee who rolls the dice and the other the carnival attendee who selects the number and wagers \$1 on each roll.
3. Play the game with your partner 25 times with the carnival employee keeping track of the attendee's wins and losses on the accompanying table.
4. Create a total of 100 instances by combining the results of all 4 groups at your table. Possible results after the combination of all 4 could be that the carnival is \$12 ahead or the carnival is \$7 behind or ..?. The carnival being \$12 ahead should be expressed as -12 (from the attendee's perspective) while the carnival \$7 behind should be expressed as +7. We will then combine the results of all the tables which will simulate several hundred instances of the game. We would expect the results from so many instances to be close to the theoretical results which we would like to analyze.

Instance	Win 1\$	Win 2\$	Win 3\$	Lose 1\$
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
Totals	times 1	times 2	times 3	times (-1)

Final Outcome for your repeated experiment - This should be the number of dollars you have won or lost using a minus sign if the result is a loss.

Final outcome for your table adding all 4 results together.