MGF2106 (Survey of Mathematics) Project 4: Probability

Purpose: Work individually or as a group to solve problems and answer questions related to theoretical and experimental probability. In this project you will be asked to work on probability within the context of games.

Instructions: Complete the project, compiling the various parts into a single document which is submitted to the Assignments link in Falcon Online. The Discussion Board in Falcon Online may be used to find classmates for working as a group. Even if you work as a group, each student must submit an individual project to the Assignments link in Falcon Online by the posted due date.

Format for Project Document Submitted to the Assignments Link:

1. The submission must be a single document formatted as .docx, .doc, .rtf, or .pdf.
2. The submission must be typed. Please check with your instructor if you have questions about the format of the document.
3. Put your name on the document. If you worked in a group, also list the names of the other students in the group.
4. Do not type the questions into your project. Just give the answers. Answers obtained with calculations should include the basic process (work) used to obtain the answer.
5. Follow the numbering system used in the project when typing your answers.

Part 1: Number Games

Visit www.flalottery.com and answer the following questions about the lottery games. Clearly explain how each of the following probabilities is computed. Click on the game you are working with, then click on "How to Play and How to Win" to find information on the probability of winning (the JACKPOT) and the values needed to calculate the probability.

1. a. What is the probability of winning the jackpot in Lotto? Express the answer as a fraction.

   b. Clearly explain how this probability is calculated.

2. a. What is the probability of winning the jackpot in Mega Millions? Express the answer as a fraction.

   b. Clearly explain how this probability is calculated.

3. If a lottery game was based on choosing 5 numbers from the numbers 1 to 40, what is the probability of choosing the numbers for the winning jackpot? Express the answer as a fraction.

4. If a lottery game was based on choosing 5 numbers from the numbers 1 to 60 with another number chosen from the numbers 1 to 25, what is the probability of choosing the numbers for the winning jackpot? Express the answer as a fraction.

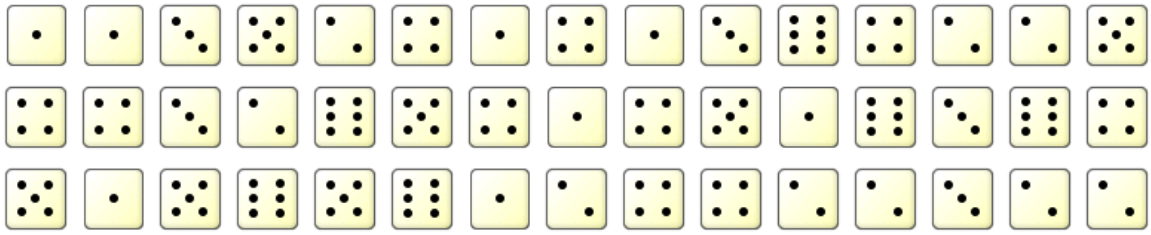
Part 2: Probability with a Die

The theoretical probability can be used to predict the likelihood of an event. If a single, 6-sided die is rolled, there are six possible outcomes, as shown in the picture below.

5. If a single die is rolled, what is the theoretical probability that the die would show a 6? Express the answer as a reduced fraction and a decimal rounded to 3 decimal places.

6. An experiment is conducted where 15 rolls are performed. The outcome is shown in the picture below. What is the experimental probability of rolling a 6? Express the answer as a reduced fraction and a decimal rounded to 3 decimal places.

7. An experiment is conducted where 45 rolls are performed. The outcome is shown in the picture below. What is the experimental probability of rolling a 6? Express the answer as a reduced fraction and a decimal rounded to 3 decimal places.



8. How do the experimental probabilities found in #6 and #7 compare to the theoretical probability found in #5?

9. How do the experimental probabilities found in #6 and #7 compare to each other? Which one is closer to the theoretical probability?

Part 3: Probability with a Spinner

Use this link to access a Spinner: http://www.mathsisfun.com/data/spinner.php

Set the "Presets" to abcde.
Set the "Regions" to 7.
Set the "Spins" to 40.
Click on "Spin" and the results will be given in a table below the spinner.

10. Type a table with the results.

Outcome	Number of Spins
a	
b	
c	
d	
e	
f	
g	

11. What is the theoretical probability that the spinner will land on "e"? Express the answer as a reduced fraction and a decimal rounded to 3 decimal places.

12. What is the experimental probability that the spinner will land on "e"? Express the answer as a reduced fraction and a decimal rounded to 3 decimal places.

13. Compare the results of #11 and #12.

Part 4: Impact Question

14. Provide an example, or examples, of how probability could be applied in life or future career choices **other than games**. Use at least 3-4 sentences to completely explain the example. Feel free to use the internet to find an example.

References:

www.flalottery.com

http://www.dicesimulator.com/

https://www.random.org/

http://www.mathsisfun.com/data/spinner.php