EMPIRICAL AND THEORETICAL PROBABILITIES

EXPERIMENT #1

Roll a dice 12 times. Let A = occurance of the side with 1 spot and B = the occurance of the side with more than 1 spots. Fill in the following table based on the results.

Table 1.1.

Event	Frequency	Empirical Probability = frequency : n
A		
B		

Note: n = the number of repetitions. In this case, n = 12

Question 1.1.: Is it A or B that is more likely to happen? Is it surprising? Tell why you consider it as surprising or not surprising.

Now roll the dice 18 times. Let A = occurance of the side with 1 spot and B = the occurance of the side with more than 1 spots. Fill in the following table based on the results.

Table 1.2.

Event	Frequency	Empirical Probability = frequency : n
A		
B		

Note: n = the number of repetitions. In this case, n = 18

Question 1.2.: Are the empirical probabilities the same as the previous? Does it surprise you? Why?

Question 1.3.: If you repeat rolling the dice 18 times, will the empirical probabilities be equal to the results you got in Table 1.1. or Table 1.2.? Why?

Question 1.4.: In general, if the probability of event X is greater than the probability of event Y, is X is more likely to happen?

EXPERIMENT #2

Roll a dice 10 times. Let C = the occurance of the side with an even number of spots and D = the occurance of the side with an odd number of spots. Fill in the following table based on the results.

Table 2.1.

Event	Frequency	Empirical Probability = frequency : n
C		
D		

Note: n = the number of repetitions. In this case, n = 10

Question 2.1.: Find the theoretical probabilities of C and D. Write them as P(C) = ... and P(D) = ...

(You may refer to https://edcommstatistics.blogspot.com/2019/09/the-theoretical-probabilities.html if needed)

Question 2.2.: Compare the empirical probabilities of C and D with the corresponding theoretical probabilities. Are the empirical probabilities equal to the theoretical probabilities? Is it surprising? Explain.

Question 2.3.: If an event X has the theoretical probability of 0.39 to occur, what does the figure mean? For example, does it mean that in every 100 chances in which X may occur, X occur 39 times? What is your opinion concerning the figure?