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Midterm Question

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CSE230: Discrete Mathematics Midterm Examination, Fall 2020

Answer all the questions below

Total marks: 40

Time: 2 hours

1. Please fill up the GENERAL INFORMATION section properly
2. Take screenshots of your answers to keep back up just in case
3. For any issues, contact your corresponding faculty
4. Complete and submit your answers within the given time limit

General Information

0 points possible (ungraded)

Fill up the following fields carefully.

Your Name:

MD. BOKHTIAR RAHMAN ✖

Student ID:

20301138 ✔

20301138

CSE230 Section

5 ✖

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You have used 2 of 2 attempts

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Combinatorics: Problem 1

4.0/8.0 points (graded)

(DO NOT use any other symbol except numbers in the answer slot) In an experiment, you flipped one coin and rolled three dice followed by the coin-flipping. An outcome of this experiment will look like (H,4,5,2) for an example . [T= Tail, H=Head]

i. How many possible outcomes (like mentioned above) can be there from this experiment?

432 ✔

432

ii. No matter what the coin shows, how many outcomes are there where all of the dice show different numbers ?

210 ✖

210

iii. How many outcomes consist of a Tail and three odd numbers? [For example: (T,1,3,5)]

27 ✔

27

iv. If at least one of the dice shows an odd number you win no matter what the coin shows. How many ways can you win the game?

0.7656 ✖

0.7656

Submit

You have used 2 of 2 attempts

Binomial

2.0/2.0 points (graded)

Find the x independent term (a term that does not have x in it) in the expansion of $(x^4 + 3/x)^5$.

405



405

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You have used 2 of 2 attempts

Multinomial

2.0/2.0 points (graded)

Find the coefficient of x in the expansion of $(4 + x^2 + 3/x^3)^4$.

144



144

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Problem 3

3.0/3.0 points (graded)

There are 3 divisions and 60 districts in the republic of "Burkina Faso". Division A has 40 districts and EACH of those districts has 5 parliamentary seats. Division B has 10 districts and EACH of those districts has 10 parliamentary seats. Division C has 10 districts and EACH of them has 2 parliamentary seats. Only one person can be elected for one parliamentary seat of his/her own district.

If you travel to one random district, what is the probability of that district having 2 parliamentary seats within its territory? [You must give the answer in decimal form (upto 4 decimal places) or in percentage form (upto 2 decimal places)]

16.67%



16.67%

Submit

You have used 2 of 2 attempts

Problem 5

12.0/12.0 points (graded)

(For the questions asking for probability, put your numerical answer in percentage and rounded to 2 decimal places. For example, if the answer is 0.22575, you have to put 22.58% in the box. DO NOT FORGET TO PUT THE PERCENT (%) SIGN AT LAST. Putting only 22.58 without the trailing percent sign will be assessed as a wrong answer! You must NOT type any other symbol, space, operator, fraction etc in the box)

Suppose, you are repeatedly rolling a black and a white dice together. If the black die shows 3 and the white die shows 5, we express the result as (3,5).

i. What is the probability that the first (4,4) will appear on the 3rd roll?

2.63%



2.63%

ii. What is the expected number of rolls required to get a (1,2)?

36



36

iii. Suppose, you roll both the dice together for 6 times. What is the probability that (3,5) will appear exactly once among the 6 rolls?

14.48%



14.48%

iv. Suppose, you roll both the dice together for 7 times. What is the probability that (6,4) will appear AT MOST once during the 7 rolls?

98.52%



98.52%

Submit

You have used 2 of 2 attempts

Expected value and Variance

6.0/9.0 points (graded)

A traditional die is a cube with each of its six sides representing the numbers from 1 to 6. Mr. Dicey customized a die by replacing each number with its reciprocal (reciprocal of x is $1/x$).

i. What is the expected value if you roll the customized die made by Mr. Dicey? [Give your answer upto 4 decimal places]

0.4083



0.4083

ii. What is the expected value if you roll the customized die for 6 times? [Give your answer upto 2 decimal places]

0.4083 ✖

0.4083

iii. What is the variance of value that you get from rolling the customized die? [Give your answer upto 4 decimal places]

0.0818 ✔

0.0818

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