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Final Question

[Bookmark this page](#)**CSE230: Discrete Mathematics
Final Examination, Fall 2020**

Answer all the questions below

Total marks: 45**Time: 2 hours 30 minutes**

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, results hidden)

*Fill up the following fields carefully.***Your Name:**

MD. BOKHTIAR RAHMAN

Student ID:

20301138

20301138

CSE230 Section

5

Submit

You have used 2 of 2 attempts

Answer submitted.

Question

5 points possible (graded, results hidden)

(If your numerical answer is NOT an integer, put it 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.)

The probability of RM winning the La Liga is 0.6, the probability of RM winning the UCL given that they have won the La Liga is 0.3 and the probability of RM winning the Champions League given that they have won the UCL is 0.7. What is the probability of RM winning the La Liga and the UCL?

KM winning the UCL given that they haven't won the La Liga is 0.1. Let's say, KM won the UCL in one season.

a. What is the probability that RM have won the La Liga?

39.13%

39.13%

b. What is the probability that RM haven't won the La Liga?

12.88%

12.88%

Submit

You have used 2 of 2 attempts

Answer submitted.

Question

5 points possible (graded, results hidden)

(If your numerical answer is NOT an integer, put it 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.)

a. Suppose that Natasha, Monim and Rehan are serving in a restaurant on roster shifting. On a working day, Natasha, Monim and Rehan are responsible for doing the job 20%, 45% and 35% time respectively. Given that, the probability of breaking a dish during wash for Natasha, Monim and Rehan is 7%, 20% and 43% respectively. Find the total probability of a dish that can not be broken in a day.

25.45%

25.45%

b. Two people have tried robbing in a government office in Bangladesh. They were about to be trapped but escaped successfully. To find the real robber, the RAB arranged a lie detector test for 50 people who were claiming that they are guiltless. Suppose that the probability of detection of not innocent people is 0.90 and guiltless people seem to be guilty with the probability 0.01. What is the probability Mr. X is guilty given that the test says he is not ?

29.41

29.41

Submit

You have used 2 of 2 attempts

Answer submitted.

Question

2.5 points possible (graded, results hidden)

If your numerical answer is not an integer, put it 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 running an experiment for 1024 times where the probability of success in a single experiment is 'p'. If the variance of the number of successful experiments is 256 , find p.

50%

50%

Submit

You have used 2 of 2 attempts

Answer submitted.

Question

2.5 points possible (graded, results hidden)

Suppose, you are running an experiment that has two outcomes, namely 'success' and 'failure'. You initially don't know the probability of success in a single experiment. But you know that, if you continue to run the experiment several times, the variance of the number of experiments required for the first success is 20. What is the expected number of experiments required for the first success? [Hint: Try to determine the probability of success in a single experiment and recall the range of the values to which a probability must belong]



Submit

You have used 0 of 2 attempts



Question

5 points possible (graded, results hidden)

If your numerical answer is NOT an integer, put it 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.

There are 3 earthquakes, on average, in a year in Delhi.

- a. What is the probability that there'll be 5 earthquakes there in the next TWO years?

16.06%



16.06%

- b. What is the probability that there'll be less than 8 earthquakes in the year 2025?

98.81%



98.81%

Submit

You have used 2 of 2 attempts



Answer submitted.

Question

3 points possible (graded, results hidden)

If your numerical answer is NOT an integer, put it 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 we have a bowl with 10 marbles - 2 red marbles, 3 green marbles, and 5 blue marbles. We randomly select 4 marbles from the bowl, with replacement. What is the probability of selecting 2 green marbles and 2 blue marbles?

14.28%



14.28%

Submit

You have used 2 of 2 attempts



Answer submitted.

Question

10 points possible (graded, results hidden)

(You only have one attempt for this question)

(Use T for true and F for false in your answers)

Use this truth table to answer questions a), b) and c).

Q	R	$\neg Q \wedge R$	$Q \rightarrow (\neg Q \wedge R)$
T	T	F	F
F	F

I	r	x1	x3
F	T	x2	T
F	F	F	x4

a) Find the value of x2

T

b) Find the value of x3

F

c) Find the value of x4

T

d) If the domain consists of all negative integers, what is the truth value of $\exists x(x + 3 = 2x)$?

F

e) $((P \wedge Q) \rightarrow (Q \vee P)) \vee (P \vee \neg Q)$. Which of the following statement is correct?

This is a contradiction

This is a tautology

This is a contingency

Submit

You have used 1 of 1 attempt

 Answer submitted.

Recurrence (Part 1)

6 points possible (graded, results hidden)

A recurrence relation is given as follows:

$$a_n = -10a_{n-1} - 25a_{n-2}$$

with boundary conditions as $a_0 = 2$ and $a_1 = 5$.

Solve the recurrence relation and answer the following questions.

1. What is the order of the above recurrence relation?

2

2

2. Which one of the following is the characteristic equation of the given recurrence relations?

$r^2 + 10r + 10 = 0$

$r^2 - 10r + 25 = 0$

$r^2 - 10r + 5 = 0$

$r^2 + 10r - 25 = 0$

$r^2 + 10r + 25 = 0$

3. How many different characteristic root(s) (r_1, r_2, \dots) is/are obtained by solving the characteristic equation?

1

1

4. Select the characteristic root(s) obtained from the characteristic equation.

3

2

-2

-5

5

5. Which of the following is the solution of the recurrence relation given above?

$a_n = 2 * (-5)^n + 3 * n * (-5)^n$

$a_n = 2 * (-5)^n - 3 * n * (-5)^n$

$a_n = 5 * (-2)^n + 3 * n * (-5)^n$

$a_n = 2 * (-5)^n + 3 * n * (-5)^n$

$a_n = 2 * (-2)^n - 3 * n * (-5)^n$

6. What is the value of a_6 ? (hint: answer is a positive integer number)

-250000

-250000

Submit

You have used 2 of 2 attempts

 Answer submitted.

Recurrence (Part 2)

6 points possible (graded, results hidden)

Consider the following recurrence relation.

$$a_n = 6a_{n-1} - 8a_{n-2} + 3^{n-1}$$

with boundary conditions as $a_0 = 2$ and $a_1 = 3$.

Solve the recurrence relation and answer the following questions.

1. What is the order of the above recurrence relation?

2

2

2. Which one of the following is the characteristic equation from the homogeneous part of the given recurrence relations?

$r^2 + 6r + 8 = 0$

$r^2 - 8r + 6 = 0$ $r^2 - 8r - 6 = 0$ $r^2 - 6r + 8 = 0$ $r^2 - 6r + 6 = 0$ **3. Select the characteristic root(s) obtained from the characteristic equation.** 2 -2 -4 4 5**4. What is the guessed solution of the particular part?** $A(2)^n$ $A(-3)^n$ $A(-2)^n$ $A(3)^n$ **5. Which of the following is the final solution of the recurrence relation given above?** $a_n = (4)^n + 4 * (2)^n - 3 * (3)^n$ $a_n = (4)^n + 4 * (2)^n + 3 * (3)^n$ $a_n = (4)^n - 4 * (2)^n - 3 * (3)^n$ $a_n = (4)^n + 2 * (4)^n - 3 * (3)^n$ $a_n = (4)^n + 2 * (4)^n - 3 * (2)^n$ **6. What is the value of a_6 ? (hint: answer is a positive integer number)**

2165

2165

Submit

You have used 2 of 2 attempts

 Answer submitted.



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