Discrete Structures

IIIT Hyderabad

Monsoon 2020

Tutorial 3

September 23, 2020

Introduction

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Instructions

We will be having a test quiz to increase your familiarity with Moodle. This is NOT GRADED. You don't need to mail them to sir in case you have not submitted.

1. Go to the "Tutorial 3 Submission" under the **Tutorials** Section on Moodle.
2. A pdf named "Tutorial 3" would be there in the portal.
3. Please download it and solve the questions **1, 2.1 and 2.2** . You **may not** submit Question 0.
4. Upload your scanned answers by **1:25PM**. We would start discussing their solutions by then.

Question 0

0.1 In the following condition, when is it equal?

$$(A \times B) \cup (C \times D) \subseteq (A \cup C) \times (B \cup D)$$

0.2 Find the number of primes between 40 - 100 using PRT.

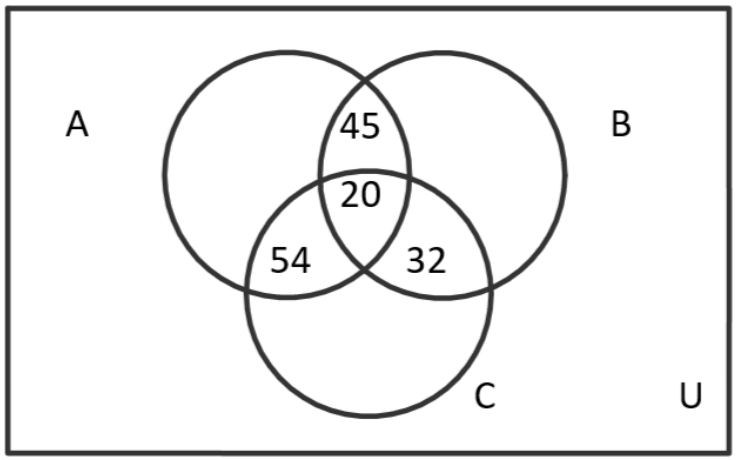
Question 1

Simplify the following -

1. $(A - (B \cup C)) \cap ((B \cap C) - A)$
2. $(A \cap B') \cup (A' \cap B) \cup (A' \cap B')$

Question 2

2.1 A is the set of people who go to resort area for vacation, B is the set of people who take cruise for vacation, C is the set of people who go to national park for vacation. Suppose $|A| = 150, |B| = 100$ and $|C| = 300$



a. How many people only go to a resort area for vacation?
b. How many people only take a cruise for vacation?
c. How many people only go to national park for vacation?
d. How many people either go to a resort area or take a cruise for vacation but not national park?
e. How many people use any of the 3 methods to take a vacation?

Question 2 (contd.)

2.2 Observe the values of the table and find the number of students who:

		Pudding			
		Chocolate	**Tapioca**	**Neither**	**Total**
Ice Cream	Vanilla	68	53	12	133
	Strawberry	59	48	9	116
	Neither	23	21	7	51
	Total	150	122	28	300

a. Like strawberry ice cream and tapioca pudding

b. Do not like pudding

c. Like at least one of the ice cream flavours

d. Like neither ice cream nor pudding

2.3 Mark the following as true or false:

a. $26 \in \mathbb{Z}$

b. $-5 \in \mathbb{N}$

c. $\sqrt{2} \notin \mathbb{Q} \cap \mathbb{R}$

d. $\mathbb{Z} \cup \mathbb{Q} = \mathbb{R}$

e. $\mathbb{R} \cap \mathbb{C} = \mathbb{R}$

Quiz conducted on 22 Sept 2020

Any doubts ?

1. If B is finite set and $A \subseteq B$ such that $|A| = |B|$, then prove, without using Venn-Euler's diagram, that $A = B$.
2. In a hostly fought battle at least 70% of the combatants lost an eye, at least 75% an ear, at least 80% an arm and at least 85% a leg. What is the least number of combatants who lost all four members?