

CSE 235 Preparation for First Midterm Spring 2010

Name(print) _____

Instructions

In preparation for the midterm, try to solve the following problems, which have proved to be a challenge for a number of students in the class. If you are encountering any difficulty, please visit with the GTA during office hours or make an appointment with him.

Generally speaking, to prepare for the midterm, we recommend that:

- You do all the examples in the slides.
- You do all the examples in the textbook.
- You do all the exercises in the homework.
- You do all the questions in the quizz.
- If you have any question about the above, you should meet with the GTA.

1 Proofs

Give a formal proof for the following statement.

If the following propositions are true

1. $\neg p \wedge q$
2. $r \rightarrow p$
3. $\neg r \rightarrow s$
4. $s \rightarrow t$

Then t holds.

2 Sets I

For the following statement, if it is true, then give a formal prove; if it is false, then give a specific counter example.

$$A \setminus (B \cap C) = (A \setminus B) \cap (A \setminus C)$$

3 Sets II

Mark each of the following as True or False, please justify your answers. Recall that \mathcal{P} is the power set.

- $\emptyset \in \mathbb{R}$
- $\emptyset \subseteq \{1, 2, 3\}$
- $0 \in \{\emptyset, \{0\}\}$
- $0 \subsetneq \{\emptyset, 0\}$
- $\{0, 1, 2\} \subseteq \mathcal{P}(\{0, 1, 2\})$
- $\{12\} \in \mathcal{P}(\mathbb{Z})$
- $|\emptyset| = 1$
- $|\mathcal{P}(\emptyset)| = 1$

4 Sets III

Let A, B be subsets of a finite universal set U . List the following in nondecreasing order.

$$|A|, |A \cup B|, |A \cap B|, |U|, |\emptyset|$$