University of
Placeholder

Example course: worksheet for week 3

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Instructions

This document contains extra practice problems for week 3. Not all material is covered.

If you wish to have your solution checked by a TA, email redacted@rrr.nl.

Question 1.

Prove that for all $n \in \mathbb{N}_0$, for all finite sets $A_1, A_2, \ldots, A_n$,

$$\left|\bigcup_{i=1}^{n} A_i\right| = \sum_{\emptyset \neq J \subseteq \{1,\ldots,n\}} (-1)^{|J|+1} \left|\bigcap_{j \in J} A_j\right|.$$

Question 2.

Let $\Sigma = \{a, b, c\}$. Prove or disprove the following statement:

> *"For all languages $L \in \Sigma^*$, if there exists a nondeterministic Turing machine M that decides L in polynomial time, then L is in $\boldsymbol{P}$."*

Question 3.

This question asks you to find a particular number.

(a) What is the answer to the ultimate question?

(b) What is the answer to the ultimate question?

(c) What is the answer to the ultimate question?

(d) What is the answer to the ultimate question?

i. What is the answer to the ultimate question?

α) What is the answer to the ultimate question?

β) What is the answer to the ultimate question?

γ) What is the answer to the ultimate question?

ii. What is the answer to the ultimate question?

iii. What is the answer to the ultimate question?

(e) What is the answer to the ultimate question?

Indicate your answer here:

◯ It is 41.

◯ It is 42.

◯ It is 43.

◯ It is 44.

Or here:

◯ It is 41. ◯ It is 42. ◯ It is 43. ◯ It is 44.

Question 4.

This is a very long question. This is a very long question.

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