Tutorial 3
Sets and Functions

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Sets

Power sets

How many elements does each of these sets have where a and b are distinct elements?

a) $\mathcal{P}(\{a, b, \{a, b\}\})$

b) $\mathcal{P}(\{\emptyset, a, \{a\}, \{\{a\}\}\})$

c) $\mathcal{P}(\mathcal{P}(\emptyset))$

Let A be a set, and the elements of A be sets.

Define $\bigcup A = \{x \mid \exists y \in A, x \in y\}$.

1) Calculate $\bigcup \{\{a,b,c\},\{a,d,e\},\{a, f\}\}$;

2) Calculate $P(A)$

3) Whether $P(\bigcup A) = A$?

- Let A and B be sets, prove

$$A \cap B = \emptyset \leftrightarrow A \subseteq \bar{B}$$

- Let A, B, and C be any sets, show that

$$A \times (B \cup C) = (A \times B) \cup (A \times C)$$

Functions and Sequences

Functions

- Show that the function f(x) = |x| from the set of real numbers to the set of nonnegative real numbers is not invertible, but if the domain is restricted to the set of non-negative real numbers, the resulting function is invertible.

- How can we produce the terms of a sequence if the first 10 terms are 1,3,4,7,11,18,29,47,76,123?

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Additional exercises on the textbook

- Section 2.1 : 7 11 13 21-27 33 39 43
- Section 2.2 : 5-10 21-23 29-31 37-43
- Section 2.3: 7,15,23-27, 33,35,41,45-47,53,59,71,73
- Section 2.4: 1-4,6-7,9