DISCRETE MATHEMATICS
MATH 381

Basic concepts and examples explaining the fundamentals of Discrete Mathematics.

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Discrete Mathematics

Contents

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Recall:

- Functions f: A→B

- Image $Im(f) = f(a)$

If f(a) = b, say "a is a preimage of b"

- $Gr(f) = \{(a,b)|f(a) = b\} \subseteq AxB$

- $Gr(f) = \{(a, f(a))|a \in A\}$

Graph $Gr(f)$ is a relation between A and B

Which binary relations (subsets of AxB) are graphs of functions?

- A subset $s \subseteq AxB$ is the graph of a function if for every element $a \in A$, there is a unique element $b \in B$ such that $(a, b) \in S$.

- <u>key</u> Can't have (a, b_1) and $(a, b_2) \in$ S where $b_1! = b_2$ and expect S to be a graph

- (abstraction of "straight line test" about graphs $f : \mathbb{R} \to \mathbb{R}$)

Restriction of Domain
    suppose $f : A \to B$
    Consider $A' \subseteq A$

    DEFINITION the restriction of f to A' is $f|_{A'} : A' \to B$ defined by $(f|_{A'}) = f(a), a \in A$