Discrete Structures

IIIT Hyderabad

Monsoon 2020

Tutorial 10

October 19 , 2020

Introduction

1. Questions
   - Question 1
   - Question 2

Question 1

1.1: Prove the following -

1. A function f has left inverse $\iff$ it is injective.
2. A function f has right inverse $\iff$ it is surjective.
3. Prove that f is onto $\iff$ $h \circ f(x) = k \circ f(x)$ implies $h = k$.

* $f \circ g$ is bijective $\iff$ f, g are bijective

1.2: Prove the following -

1. $f(A \cup B) = f(A) \cup f(B)$
2. $f^{-1}(A - B) = f^{-1}(A) - f^{-1}(B)$

Question 2

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2.1: Prove that the set of of all odd numbers are countable.
2.2: Prove that $\mathbb{Z} \times \mathbb{Z}$ is countable.
2.3: [*] Let $f, g : \mathbb{N} \to \mathbb{N}, f(x) = x^2, g(x) = x^3$. Prove that the sets $Range(f)$ and $Range(g)$ have same cardinality.