

Tutorial 5

CSCI2110/MATH2080: Discrete Mathematics

2.3 - Functions

2.4 - Sequences and Series

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Question 1 - One-to-One in the Real World

(Rosen 16/162) Consider these functions from the set of students in our discrete mathematics class. Under what conditions is the function one-to-one if it assigns to a student his or her:

- 1 Cell phone number
- 2 Banner ID number
- 3 Final grade in class
- 4 Home town

Question 2 - One-to-one and Onto Examples

(Rosen 20/162) Give an example of a function from \mathbb{N} to \mathbb{N} that is:

- 1 one-to-one but not onto.
- 2 onto but not one-to-one.
- 3 both onto and one-to-one (but is different from the identity function).
- 4 neither one-to-one nor onto.

Question 3 - Proof with One-to-one

(Rosen 36/163) If f and $f \circ g$ are one-to-one, does it follow that g is one-to-one? Justify your answer.

Question 4 - Sums Examples

(Rosen 29/179) What are the values of these sums?

① $\sum_{k=1}^5 (k + 1)$

② $\sum_{j=0}^4 (-2)^j$

③ $\sum_{i=1}^{10} 3$

④ $\sum_{j=0}^8 (2^{j+1} - 2^j)$