CS113/DISCRETE MATHEMATICS-SPRING 2024

Worksheet 16

Topic: Mathematical Induction

Continuing our exploration of mathematical induction, we will now delve into its application in proving divisibility and working with sets. Happy Learning!

Student's Name and ID: _____

Instructor's name: _____

1. . Prove that 2 divides n^2 + n whenever n is a positive integer.

2. Prove that 6 divides $n^3 - n$ whenever n is a nonnegative integer.
   integer.

3. Prove that if $A_1, A_2, \ldots, A_n$ and B are sets, then

$$(A_1 \cap A_2 \cap \ldots \cap A_n) \cup B = (A_1 \cup B) \cap (A_2 \cup B) \cap \ldots \cap (A_n \cup B).$$

4. Prove that if $A_1, A_2, \ldots, A_n$ and B are sets, then

$$(A_1 \cup A_2 \cup \ldots \cup A_n) \cap B = (A_1 \cap B) \cup (A_2 \cap B) \cup \ldots \cup (A_n \cap B).$$