# CSCE 222: Discrete Structures for Computing
# Section 503
# Fall 2016

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**Problem Set 5**

**Due: 2 October 2016 (Sunday) before 11:59 p.m.** on eCampus (`ecampus.tamu.edu`).
You must show your work in order to recieve credit.

**Problem 1.** (25 points)
Suppose that $A$, $B$, and $C$ are sets. Prove or disprove that $(A - B) - C = (A - C) - B$.

**Solution.**

**Problem 2.** (25 points)
Determine whether the symmetric difference is associative; that is, if $A$, $B$, and $C$ are sets, does it follow that $A \oplus (B \oplus C) = (A \oplus B) \oplus C$?

a. Use a Venn diagram.

b. Use a membership table.

c. Use set identities.

**Solution.**

**Problem 3.** (25 points)
Determine whether $f$ is a function from $\mathbb{Z}$ to $\mathbb{R}$ if

a. $f(n) = \pm n$

b. $f(n) = \left\lceil \frac{n}{2} \right\rceil$

c. $f(n) = \sqrt{n^2 + 1}$

d. $f(n) = \sqrt{n}$

e. $f(n) = \frac{1}{n^2 - 4}$

**Solution.**

**Problem 4.** (25 points)

Consider the function $f : \mathbb{Z} \to (\mathbb{N} - \{0\})$ where $f(n) = \begin{cases} 1 - 2n & n \leq 0 \\ 2n & n > 0 \end{cases}$

a. Prove that $f$ is a bijection by showing that it is both injective and surjective.

b. Find the inverse function $f^{-1}$.

**Solution.**

**Aggie Honor Statement:** On my honor as an Aggie, I have neither given nor received any unauthorized aid on any portion of the academic work included in this assignment.

**Checklist:** Did you...

1. abide by the Aggie Honor Code?
2. solve all problems?
3. start a new page for each problem?
4. show your work clearly?
5. type your solution?
6. submit a PDF to eCampus?