

CSCE 222: Discrete Structures for Computing  
Section 503  
Fall 2016

YOUR NAME HERE

September 25, 2016

**Problem Set 5**

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

**Problem 1.** (25 points)

Suppose that  $A$ ,  $B$ , and  $C$  are sets. Prove or disprove that  $(A - B) - C = (A - C) - B$ .

**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.

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

**Problem 4.** (25 points)

Consider the function  $f : \mathbb{Z} \rightarrow (\mathbb{N} - \{0\})$  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  $f^{-1}$ .

**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?