

CSE 322 Winter 2006

Homework Assignment # 1

Due Date: Friday, January 13 (at the *beginning* of class)

1. (25 points) Write formal descriptions of the following sets:
Examples: Set containing 1, 10, 100 = $\{1, 10, 100\}$
Set containing all even integers = $\{n \mid n = 2m \text{ for some } m \in \mathbb{Z}\}$
 - a. The set containing all prime numbers between 20 and 30
 - b. The set containing all odd integers less than 100
 - c. The set containing the empty string and all binary strings of length 10
 - d. The set of all binary strings of length 2 or more that begin and end in the same symbol
 - e. The set of all strings over the alphabet $\{a, b, \dots, z\}$ that contain the word “huskies” as a substring but not the word “cougars”

2. (25 points) Let A be the set of integers between -10 and 10 divisible by 6. Let B be the set of integers between -7 and 7 divisible by 3.
 - a. Which of the following statements is/are true: $A \subseteq B, B \subseteq A, A \cap B \neq \emptyset$
 - b. Prove or disprove: $A - B = B - A$ (Recall: $B - A = B \cap \bar{A}$)
 - c. Prove or disprove: $A \times B = B \times A$
 - d. What is A^3 ? (List all the elements)
 - e. What is the power set of A?

3. (25 points) Prove, using the definition of set equality, that for all sets A, B, and C:
 $((A - B) \cup (A - C)) = A - (B \cap C)$

4. (25 points) Let Σ be an alphabet and let $x, y \in \Sigma^*$. Show that $(xy)^R = y^R x^R$ where R denotes the string reversal operation (hint: use induction on the length of y).