

1. (4 pts) Write out the pronunciation of these.

a) $\{x \mid 1 \leq x^2 \leq 4\}$

b) $S \cup T \subset [0, 1]$

2. (4 pts) a) Give the definition of *generalization*.

b) Give the definition of *conditional sentence*.

3. (2 pts) Give the form of: " $ab = 0$ if and only if $a = 0$ or $b = 0$."

4. (3 pts) Are the two sentences equivalent? (Yes or No). If not, give a **specific** counterexample.

a) $bc = bd, \quad c = d$

b) $x \in S \cup T, \quad x \in S \text{ and } x \in T$

c) $2x = 8, \quad 2k = 8$

5. (3 pts) Is the letter x a placeholder in the sentence? (Yes or No).

a) Let $f(x) = 5(x - 7)$

b) $2x = 8$

c) $2x = 8 \text{ iff } x = 4$

6. (5 pts) Set-theory operations and logical connectives correspond perfectly. Which logical connective corresponds to

a) intersection b) union c) equality d) subset e) complement

7. (5 pts) Grammar. Some (not necessarily all) of these have **grammatical** mistakes or unconventional usages. Which ones, and what is wrong?

a) $A \Rightarrow B$

b) $S \text{ and } T$

c) $5 \in [-\infty, 7]$

d) $S \subset (-\infty, \infty)$