

# Problem Set 1

NAME

DATE

## 1. Identification

(a) Identify the following Greek letters by name. Include the meaning and common usage if you are able.

i.  $\delta$

ii.  $\beta$

iii.  $\alpha$

iv.  $\theta$

v.  $\lambda$

vi.  $\mu$

vii.  $\Delta$

(b) Identify the following mathematical symbols by name. Include the meaning/usage.

i.  $\in$

ii.  $\cup$

iii.  $\subset$

iv.  $\&$  and  $|$

## 2. Necessary and Sufficient

- (a) Provide an example of a necessary condition
- (b) What is the difference between necessary and sufficient?

### 3. Set theory

- (a) In roster notation, write the set characterized in set-builder notation as  $S = \{x \in \mathbb{Z}, 2 < x < 5\}$ .
- (b) Is the following statement True or False?  $\forall x \in S, x \geq 2$  for  $S = \{3, 2, 5, 9\}$ .
- (c) Is the following statement True or False?  $\exists x \in S$  s.t.  $x \notin \mathbb{Z}$  for  $S = \{3, 2, 5, 9\}$ .
- (d) Is  $\{1, 2, 3, 4\}$  a subset of  $\{4, 3, 1, 2\}$ ? Is it a proper subset?
- (e) Using logical symbols (including  $\exists$  and  $\forall$ ) write the definition of a proper subset.
- (f) If  $A = \{\text{soup}, 8\}$  and  $B = \{x, \text{soup}\}$  find  $A \cup B$ .
- (g) (Follow-up): Now find  $A \cap B$ .
- (h) (Follow-up): Find the Cartesian Product  $A \times B$ .

### 4. Topics and Questions

- (a) List three things you struggled with on today's assignment.
- (b) What is your plan for improving the items listed above?
- (c) What percent of the material was new to you today?
- (d) What is one new concept you learned today?
- (e) What question do you still have about the material?