14. Complete the following assignment prior to Meeting #4:

A. Study our notes from Meeting #3 and comprehend Jim's sample responses to the Quiz #3 prompts that are posted on *Canvas*.

B*. Examine each of the following propositions, determine whether or not it is true, display your choice by circling either "T" or "F":

i. $(A = \{0, 1, 3\} \wedge B = \mathbb{N}) \Rightarrow A - B = B - A$

T F

Rationale: $A - B = \{0\} \wedge B - A = \{2, 4, 5, 6, 7, 8, ...\}$

ii. $7 \in \mathbb{N} \times \mathbb{N}$

T F

Rationale: $\mathbb{N} \times \mathbb{N}$ contains only ordered pairs (e.g., (1, 7) and (7, 7) but not the number 7 since 7 is not an ordered pair.

iii. $\mathbb{N} \times \mathbb{N} \subset \mathbb{R} \times \mathbb{R}$

T F

Rationale: $\mathbb{N} \times \mathbb{N}$ contains only ordered pairs of natural numbers and $\mathbb{N} \subset \mathbb{R}$. Thus, each ordered pair of natural numbers is an ordered pair of real numbers. Also $\mathbb{R} \times \mathbb{R}$ also contains ordered pairs of real numbers that are not natural (e.g., (0, 11.34).

iv. $\forall A \in \{\text{sets}\}, A^c - A = V \Rightarrow A = \varnothing$

T F

Rationale: Since $(A^c - A = \{x : x \in A^c \wedge \nexists x \ni x \notin V\}), \nexists x \ni x \in A$

v. $\forall A \in \{\text{sets}\},\ A \cap \varnothing = A$

T F

Rationale: $\nexists x \ni x \in \varnothing$. Thus, $\nexists x \ni x \in \varnothing$ and $x \in A$. $\therefore \nexists x \ni x \in \varnothing \cap A$.

vi. $A, B \in \{\text{ sets }\} \Rightarrow A \cap B \subset A$

T F

Rationale: Suppose $B = A$, then $A \cap A = A$. So although $A \cap B \subseteq A$, $A \cap B \not\subset A$.

vii. $A \in \{\text{ sets }\} \Rightarrow A \cap A^c = \varnothing$

T F

Rationale: By definition $A^c = \mathrm{V} - A$, thus A and A^c share no elements.

viii. $A \in \{\text{sets}\} \Rightarrow A \cup A^c = V$

T F

Rationale: Since $(\nexists x \ni x \notin \mathrm{V} \wedge (x \in A \veebar x \in A^c))$, $\nexists x \ni x \notin A \cup A^c$

ix. $\forall A \in \{\text{sets}\},\ V - A^c = A$

T F

Rationale: Since $(\nexists x \ni x \notin \mathrm{V} \wedge (x \in A \veebar x \in A^c))$, $V - A^c = A$

x. $(\mathbb{R} - (\mathbb{I} \cup \mathbb{Q})) \cap \{ x \in \mathbb{R} : x \le 0 \} = [0, \infty)$

T F

Rationale: Since $\mathbb{R} = (\mathbb{I} \cup \mathbb{Q})$, $\mathbb{R} - (\mathbb{I} \cup \mathbb{Q}) = \mathbb{R} - \mathbb{R} = \varnothing$. The intersection of the empty set and any set is empty. Furthermore, $11 \in [0, \infty)$. So $[0, \infty) \ne \varnothing$

xi. $V = \mathbb{Z} \Rightarrow \{ {}^{-}n : n \in \omega \}^{c} = \mathbb{N}$

T F

Rationale: $\{ {}^{-}n : n \in \omega \} = \{ {}^{-}0, {}^{-}1, {}^{-}2, {}^{-}3, \ldots \}$. And given that $V = \mathbb{Z}$, $\{ {}^{-}n : n \in \omega \}^{c} = \mathbb{Z} - \{ {}^{-}0, {}^{-}1, {}^{-}2, {}^{-}3, \ldots \} = \{ 1, 2, 3, \ldots \} = \mathbb{N}$

xii. $(7, 0) \in \mathbb{N} \times \mathbb{N}$

T F

Rationale: By definition 011E, ($\mathbb{N} \times \mathbb{N} = \{ (x, y) : x, y \in \mathbb{N} \}$, but since 0 is not a natural number $(7, 0) \notin \mathbb{N} \times \mathbb{N}$.

C. Compare your responses to the 12 homework prompts from 14-B to the sample responses and accompanying explanations posted on *Canvas*.

D. Comprehend the entries from Lines #011–012 from our *Glossary* document.