MATH1050 Assignment 5 (Answers and selected solutions)

1. **Answer.**

   (a) True.

   (b) False.

   (c) False.

2. **Answer.**

   (a) True.

   (b) False.

   (c) False.

   (d) True.

   Answer.

3. (a) (I) Suppose $S \in \mathfrak{P}(C) \cup \mathfrak{P}(D)$

   (II) $S \in \mathfrak{P}(C)$ or $S \in \mathfrak{P}(D)$

   (III) Suppose $S \in \mathfrak{P}(C)$.

   (IV) $S \subset C$

   (V) Since $x \in S$ and $S \subset C$, we have $x \in C$.

   (VI) $x \in C$ or $x \in D$

   (VII) $x \in C \cup D$

   (VIII) $S \subset C \cup D$

   (IX) $S \in \mathfrak{P}(C \cup D)$

   (X) $S \in \mathfrak{P}(C \cup D)$

   (b) (I) $A \cup B \subset B$

   (II) it were true that $A \backslash B \neq \emptyset$

   (III) $x_0 \in A \backslash B$

   (IV) $x_0 \in A$

   (V) $x_0 \in B$

   (VI) $x_0 \in A \cup B$

   (VII) $x_0 \in B$

   (VIII) Contradiction arises

   (c) (I) if $x \in A \cap B$ then $x \in A$

   (II) Suppose $x \in A \cap B$

   (III) $x \in A$ and $x \in B$

   (IV) $x \in A$

   (V) For any object x, if $x \in A$ then $x \in A \cap B$

   (VI) Pick any object x. Suppose $x \in A$.

   (VII) $x \in A$ and $A \subset B$

   (VIII) $x \in A$ and $x \in B$

   (IX) $x \in A \cap B$

   (X) $A \cap B \subset A$

   (XI) $A \cap B = A$

   (XII) For any object x, if $x \in A$ then $x \in B$

   (XIII) $x \in A$

   (XIV) $A \cap B = A$

   (XV) by the definition of intersection, we have $x \in A$ and $x \in B$

   (XVI) $x \in B$

(d)   (I) Suppose $x \in C \backslash B$.

(II) complement

(III) $x \in C$ and $x \notin B$

(IV) Suppose it were true that $x \in A$.

(V) since $x \in A$ and

(VI) $x \in B$

(VII) and

(VIII) $x \in C$ and $x \notin A$

(IX) $x \in C \backslash A$

(X) Pick any object x. Suppose $x \in A$.

(XI) Suppose it were true that $x \notin B$.

(XII) and $A \subset C$

(XIII) $x \in C$

(XIV) $x \in C$ and $x \notin B$

(XV) $x \in C \backslash B$

(XVI) $x \in C \backslash A$

(XVII) complement

(XVIII) $x \in C$ and $x \notin A$

(XIX) $x \notin A$

(XX) $x \in A$ and $x \notin A$

4. ——

5. **Answer.**

   (a) False.

   (b) True.

   (c) False.

   (d) False.

   (e) True.

   (f) False.

6. ——