

Homework #2

1. Let $M = (8, 15)$, $N = (9, 20)$ on real axis, then $K = M \cup N$ will be:
 - a) $[8, 20]$
 - b) $(8, 20)$
 - c) $(9, 20)$
 - d) $(8, 15)$
2. How many elements does this set have where a and b are distinct elements ($P(x)$ – power set)?
 - a) $P(\{a, b, \{a, b\}\})$
3. Translate each of these quantifications into English and determine its truth value.
 - a) $\forall x \in \mathbf{R} (x^2 \neq -1)$
 - b) $\exists x \in \mathbf{Z} (x^2 = 2)$
4. Let $A = \{1, 2, 3, 4, 5\}$ and $B = \{0, 3, 6\}$. Find
 - a) $A \cup B$
 - b) $A \cap B$
 - c) $A - B$
 - d) $B - A$
5. Prove that if A and B are sets, then
 - a) $A - B = A \cap B^c$
6. Let $A = \{0, 2, 4, 6, 8, 10\}$, $B = \{0, 1, 2, 3, 4, 5, 6\}$ and $C = \{4, 5, 6, 7, 8, 9, 10\}$. Find
 - a) $A \cap B \cap C$
 - b) $(A \cup B) \cap C$
7. Draw the Venn diagrams for the following formulas
 - a) $A \cap (B - C)$
 - b) $A^c \cap B^c \cap C^c$
8. Simplify
 - a) $A^c \cup (A \cup B^c \cup C^c)^c \cup (B \cap (A \cup C)^c)$