

MATH 300: Homework 1

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1 Problem 1

Prove $S = A \cap (B \cup C), T = (A \cap B) \cup (A \cap C)$ are subsets

Proof. Suppose $x \in S \implies x \in A \wedge (x \in B \vee x \in C)$

$$\equiv (x \in A \wedge x \in B) \vee (x \in A \wedge x \in C)$$

$$\equiv (A \cap B) \cup (A \cap C) \implies S \subset T$$

Suppose $x \in T \implies x \in (A \cap B) \vee x \in (A \cap C)$

$$\equiv x \in A \wedge x \in (B \vee C)$$

$$\equiv A \cap (B \cup C) \implies T \subset S$$

$$\therefore S = T$$

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