

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

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

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

$$\therefore S = T$$

□