# 18.100A Assignment 2

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## Problem 1

*Proof.* (By contradiction).

Suppose instead that $xy \leq xz$. Then

$\implies xy - xz \leq 0$

$\implies x(y - z) \leq 0.$

Since $x < 0$ by assumption, it must then be true that $y - z \geq 0$. But then

$\implies y \geq z \quad \Rightarrow\Leftarrow,$

which is a contradiction since we assumed that $y < z$. Thus, $xy > xz$. $\square$

## Problem 2

*Proof.* We want to show that $\exists b \in S$ such that $\forall a \in A$, $a \leq b$.

Since $S$ is ordered, then for every $x, y \in S$, we have that either $x < y$, $x > y$, or $x = y$. But since $A \subset S$, then $\forall a \in A$, $a \in A \implies a \in S$.

$\implies \forall a, b \in A$, either $a < b$, $a > b$, or $a = b$.

So $A$ is also ordered. Since $A$ is finite, then $\exists a_0 \in A$ such that $\forall a \in A$, $a_0 \geq a$.

Thus, $A$ is bounded. $\square$