Directions. Please submit your answer to the following problem in a \LaTeX-prepared document. Class participants are encouraged to prepare solutions in a collaborative mode but to prepare their to-be-submitted write-ups individually. The consequences of sharing files, electronic or otherwise, are discussed in the course syllabus.\footnote{If the wording of this problem was discussed in detail in the classroom, the course instructor expects to see similar phrases and sentences in reading the submissions.}

Please include the problem number along with a statement of the problem in your submission. Please also include your e-mail address.

\textbf{Problem.} Let $F$ denote an ordered field ordered by the subset $F^+$. Recall that:

1. if $x, y \in F^+$ then $x + y \in F^+$
2. if $x, y \in F^+$ then $xy \in F^+$
3. if $x \in F$ then exactly one of the following holds: (i) $x \in F^+$, (ii) $-x \in F^+$, (iii) $x = 0$.

Recall that $F^+$ is the set of \textbf{positive elements} in the \textbf{ordered field} $F$.

Recall that for $x, y \in F$ one writes $x < y$ (or $y > x$) if $y - x \in F^+$. Recall that $-x = (-1)x$ and that $y - x$ means $y + (-x)$.

Let $F$ denote an ordered field and $x, y, z \in F$. Prove the following statements.

1. If $x < y$ and $z > 0$ then $xz < yz$.
2. $1 > 0$.
3. If $x > 0$ then $x^{-1} > 0$.