

MATH 414 SPRING 2004 Homework for January 12-14
(due January 21)

1. If $x, y \in \mathbb{R}$, show that $|xy| = |x||y|$. (Suggestion: check all of the cases.)
2. If $x, y \in \mathbb{R}$ show that $xy \leq \frac{x^2 + y^2}{2}$. (Suggestion: start with the fact that $(x - y)^2 \geq 0$.)
3. Let S be the open interval $(1, 2)$ and T be the closed interval $[-2, 2]$. Describe the following sets as clearly as possible:
 - (i) $S \cup T$
 - (ii) $S \cap T$
 - (iii) $\mathbb{R} \setminus S$
 - (iv) $T \setminus S$
 - (v) $\mathbb{R} \setminus (T \setminus S)$
4. Show that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
5. Do #5 on page 9 of the text.