CSE 321: Discrete Structures **Winter 2000**

Assignment #5

Due in class: Wednesday, February 16

1. Prove that for all $a, b, c \in \mathbb{Z}^+$, $\quad a \mid b \iff (ac) \mid (bc)$.
2. Prove that for all $a, b, c \in \mathbb{Z}^+$, $\quad \gcd(ac, bc) = c \cdot \gcd(a, b)$.
3. Prove that for all $a, b, c \in \mathbb{Z}^+$, $\quad a \mid b\ ,\ a \mid c \implies a \mid \gcd(b, c)$.
4. Prove that for all $a, b, c \in \mathbb{Z}^+$, $\quad a \mid c\ ,\ b \mid c\ ,\ \gcd(a, b) = 1 \implies (ab) \mid c$.
5. Prove that for all $a, b, c \in \mathbb{Z}^+$, $\quad \exists\, x, y \in \mathbb{Z}$ such that $ax + by = c \iff gcd(a, b) \mid c$.

You may use the result of any previous problem in the proof of any subsequent problem.