Feel free to work with other students on these problems. However all written work should be your own. Also, be sure to give written credit, on the assignment, for any ideas you get from other people.

All proofs should be as short and clear as possible. If you deviate from the style of proof given in the notes you should only do so consciously and for good reason.

Exercise 6.1 (Proposed by Ben Daniels). For all $a, b, c, d \in \omega$, if $a < b$ and $c < d$ then $a + c < b + d$.

Exercise 6.2. Suppose that $m, n \in \omega$ and that $m < n$. Then there exists $p \in \omega$ such that $n = m + p^+$. [Hint: argue by induction on p.]

Exercise 6.3. Prove that $\cdot_{\mathbb{Z}}$ is well-defined. (Only look in Enderton if you *really* need a hint.)

Exercise 6.4. For all $b \in \mathbb{Z}$, $b <_{\mathbb{Z}} 0_{\mathbb{Z}}$ iff $0_{\mathbb{Z}} <_{\mathbb{Z}} -b$.

Exercise 6.5. For all $b \in \mathbb{Z}$, either $b = 0_{\mathbb{Z}}$ or $b \cdot_{\mathbb{Z}} b$ is positive.