Homework Due 10/12/17: (13 problems)
Section 4.2 pages 177 - 178; 1, 2, 4, 5(a)(c)(e)(g)(i)(k), 9, 10, 17, 18
Test up to 4.2.4 on 10/5/17
(theorem 4.2.1 is a possibility on test)

Since 4.2.1 is a possibility, I'm going to redo it here:

Theorem 4.2.1

Assume that (s_n) and (t_n) are convergent sequences with lim s_n = s and lim t_n = t. If $s_n \leq t_n$ $\forall$ n $\in \mathbb{N}$, then s $\leq$ t.

Proof.

Suppose, instead, that s > t.
Let: $\epsilon = \frac{(s-t)}{2} > 0$
Now, we have 2ϵ = s − t
t = s − 2ϵ
s = t + 2ϵ
t + ϵ = s − ϵ
By the definition of convergent sequences,
$\exists$ $N_1 \in \mathbb{N}$ st n $\geq$ N_1 implies s − ϵ > s_n > s + ϵ
and, similarly
$\exists$ $N_2 \in \mathbb{N}$ st n $\geq$ N_2 implies t − ϵ > t_n > t + ϵ
Let: N = max {N_1, N_2}
Then, for n $\geq$ N, we have
t_n > t + ϵ = s − ϵ > s_n
Which contradicts the assumption that $s_n \leq t_n$ $\forall$ n $\in \mathbb{N}$
Thus, we conclude that s $\leq$ t

$\square$