

HOMEWORK 15

Problems 1 through 4 are due Wednesday Dec. 5.

- 1) Fitzpatrick section 2.1 number 17.
- 2) Chartrand number 12.41.
- 3) Prove every real number is the limit of a sequence of irrationals.
- 4) Let $\{a_n\}$ and $\{b_n\}$ be convergent sequences where there exists an index N such that $a_n \geq b_n$ for all $n \geq N$. Prove $\lim a_n \geq \lim b_n$.

Problems 5 through 8 are due Friday Dec. 7.

- 5) Let $a, b \in \mathbb{R}$ where $a \leq b$. Prove $[a, b]$ is closed.
- 6) Let $b, L \in \mathbb{R}$. Prove if $b \geq L - \epsilon$ for all positive ϵ , then $b \geq L$.
- 7) Let S be a (non-empty) bounded set of real numbers. Prove there are sequences (most likely distinct!) in S that converge to $\sup S$ and $\inf S$.
- 8) Using the definition of convergence (or its negation) prove the sequence $\{\frac{2n+1}{n-3}\}$ does NOT converge to 1.