

MATH 16200 SECTION 30, HOMEWORK 9

DUE DATE TUESDAY, MARCH 10

- (1) For the sequence $a_n = (-1)^{n+1}(3 + \frac{2}{n})$, determine $\inf\{a_n\}$, $\sup\{a_n\}$, $\overline{\lim}_{n \rightarrow \infty} a_n$ and $\underline{\lim}_{n \rightarrow \infty} a_n$. Note that the first two are suprema and infima of a *set* while the latter two are the limsup and liminf of the *sequence*.
- (2) Let $A \subset \mathbb{R}$ and let (x_n) and (y_n) be sequences such that for all n , $x_n \in A$ and y_n is an upper bound of A . Prove that if (x_n) and (y_n) converge to the same limit z , then $z = \sup A$.