



2009-10-22

2nd Home work Analysis I (engl.)
Winter Term 2009/10

(H2.1)

Find all solutions $z \in \mathbb{C}$ of the equations:

- (a) $\frac{z}{1-i} + \frac{8+i}{i-2} = \frac{1}{2}\bar{z} - 3 - 2i$,
- (b) $4z + \frac{52}{z} = 24$ with $z \neq 0$,
- (c) $z^2 - (3 + 5i)z - 16 + 4i = 0$.

(H2.2)

Let $A, B \subseteq \mathbb{R}$ be nonempty bounded subsets of \mathbb{R} . Prove that:

- (a) $\sup\{a + b : a \in A, b \in B\} = \sup A + \sup B$,
- (b) $\sup\{a - b : a \in A, b \in B\} = \sup A - \inf B$.

(H2.3)

Let $\{M_\alpha : \alpha \in A\}$ be a (finite or infinite) family of nonempty sets $M_\alpha \subset \mathbb{R}$. (It is implicit when speaking of a family of sets that the index set A is nonempty.) Let $M = \bigcup_{\alpha \in A} M_\alpha$ be the union of the family. Assume that M has an upper bound. Let $m_\alpha = \sup M_\alpha$. Prove that $\sup M = \sup\{m_\alpha : \alpha \in A\}$ holds.