

Name: _____

MA 5320 Quiz 2

1. Prove the lemma **Lemma:** Let S be a bounded and nonempty subset of \mathbb{R} and let $\alpha = \sup(S)$. For all $\varepsilon > 0$ then there is some $x \in S$ so that $\alpha - \varepsilon < x \leq \alpha$.
2. Section 2.1: 7, 10
3. Define (a_n) by
$$a_1 = 1, \text{ and } a_n = \sqrt{2 + a_{n-1}} \quad \forall n \in \mathbb{N}.$$
 - (a) Prove (a_n) is monotone.
 - (b) Prove (a_n) is bounded.
 - (c) Apply the MCT to show (a_n) is convergent. What is the limit of (a_n) ?
4. Prove the if $a_n \rightarrow a$ and $b_n \rightarrow b$ then $a_n b_n \rightarrow ab$.
5. Section 2.2: 10, 11