MATH 341, ASSIGNMENT #3
DUE: WEDNESDAY, JANUARY 30, IN CLASS

Q1. Exercise 2.5.1 on p. 31.

Q2. Exercise 3.1.2 on p. 46.

Q3. Exercise 3.2.2 on p. 46.

Q4. Exercise 3.2.3 on p. 46.

Q5. Exercise 3.3.3 on p. 47.

Q6. Exercise 3.7.1 on p. 48.

Q7. Prove the $K - \epsilon$ principle on p. 40.

Q8. Prove or provide a counterexample for each of the following statements.

(1) If (a_n) and (b_n) are bounded above, so is $(a_n b_n)$.
(2) If (a_n) and (b_n) are both divergent, then $(a_n + b_n)$ is divergent.
(3) If (a_n) and $(a_n b_n)$ are both convergent, then so is (b_n).
(4) If (a_n) is convergent, then so is (a_n^2).
(5) If (a_n^2) is convergent, then so is (a_n).
(6) If $a_n < b_n$ both converge, then $\lim_{n\to\infty} a_n < \lim_{n\to\infty} b_n$.

Challenge. Let $a_1 = \sqrt{2}$ and define a_n recursively by $a_{n+1} = \sqrt{2 + a_n}$. Show the limit exists and compute it.