Name: _____

Please show all work. If you use a theorem, name it or state it.

1. Suppose A, B are nonempty bounded subsets of $\mathbf{R}$. Let $A + B = \{a + b \colon a \in A, b \in B\}$. Prove that $\inf(A + B) = \inf A + \inf B$.

2. Prove that the sequence $(-1)^n \dfrac{n}{n+1}$ diverges.

3. Suppose $A \neq \varnothing$ and bounded below. Prove there is a sequence (a_n) in A such that $a_n \to \inf A$.

4. Suppose $x_1 = 1$ and $x_n = \sqrt{x_{n-1} + 2}$ for $n > 1$. Show that the sequence (x_n) is monotone increasing and bounded above, thus convergent. Find the limit.

1	2	3	4	total (40)