

You have 20 minutes to take this quiz. Each problem will be graded for clarity of work as well as correctness, so show all work **clearly and in order**. Circle or otherwise indicate your final answers. Please note that there are problems on both the front and the back of this page.

YOU MAY USE CALCULATORS ON THIS QUIZ, WITH THE USUAL RESTRICTIONS.

All of the problems on this quiz are similar to homework problems.

1. (0 points) Find the least upper bound (if it exists) and greatest lower bound (if it exists) for the set $S = \{x \mid x^2 - 2x - 3 < 0\}$. Show your work.

$\text{lub}(S) =$ _____
$\text{glb}(S) =$ _____

2. (0 points) Let $\{a_n\}$ be the sequence defined recursively by $a_1 = 1$, $a_{n+1} = \frac{1}{n+1} a_n$. Find a formula for the general term a_n of this sequence. Show your work.

$a_n =$ _____

3. (0 points) Consider the sequence $\{a_n\} = \{(-1)^{2n+1}\sqrt{n}\}$. Circle **ALL** of the words listed below that apply to this sequence.

bounded above

bounded below

bounded

monotonic

increasing

decreasing

not monotonic

nonincreasing

nondecreasing

4. (0 points) Suppose that b is an upper bound for a set S of real numbers. Prove that if $b \in S$, then $b = \text{lub}(S)$. Try to make your proof clear, logical, and to the point. You will be graded for clarity and brevity as well as correctness. Think before you write!