

Name: _____

1. (1 point) T True or False: Every bounded sequence of real numbers has a convergent subsequence.
2. (1 point) T True or False: A sequence of real numbers converges if and only if it is Cauchy
3. (1 point) F True or False: Every Cauchy sequence of rational numbers converge to a rational number.
4. (1 point) Fill in the blanks in the definition of a convergent sequence below:

“A sequence $\{a_n\}$ of real numbers converges to a real number A if _____
 $\varepsilon > 0$, _____ $N \in \mathbb{N}$ such that $n > N$ implies $|a_n - A| < \varepsilon$.”

Solution: A sequence $\{a_n\}$ of real numbers converges to a real number A if **for all** $\varepsilon > 0$, **there exists** $N \in \mathbb{N}$ such that $n > N$ implies $|a_n - A| < \varepsilon$.

5. (1 point) Determine the error in the following argument:

Question 1. *Is it true that there exists an even prime number? Prove your answer.*

Proof. No, it is not true. A counterexample would be 3, since 3 is prime but not even. \square

Solution: To disprove an existential statement, one must prove a universal statement. A counterexample will not suffice.