
Math 307
Final Homework, not to be turned in

1. Let $a_n = \frac{(-1)^n}{n+1}$. Prove, from the definitions, that the sequence a converges to 0.
2. Let $a_n = \frac{3n^2}{n^2+1}$. Prove, from the definitions, that a converges to 3.
3. Let $a_n = n^3 + 1$. Prove, from the definitions, that the sequence a does not converge to any real number.
4. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be given by $f(x) = 2x - 5$. Prove, from the definitions, that f is continuous at 1.
5. A function $f: S \rightarrow T$ is said to be **onto** if $(\forall x \in T)(\exists a \in S)[f(a) = x]$.
 - (a) Let $f: \mathbb{Z}_5 \rightarrow \mathbb{Z}_5$ be given by $f(x) = x^2$. Is this function onto?
 - (b) Let $f: \mathbb{Z}_7 \rightarrow \mathbb{Z}_7$ be given by $f(x) = x^3$. Is this function onto?
 - (c) Suppose given that $f: S \rightarrow T$ is onto, and that $A \subseteq T$. Prove that $f(I_f(A)) = A$.