

Math 544 Exam 4 Summer 2000

Use the paper provided. Put your name on the front of the first page and the back of the last page. Problem 7 is worth 8 points each. The other problems are worth 7 points each.

1. Define “open set”.
2. Define “compact set”.
3. Let $f: E \rightarrow \mathbb{R}$ be a function which is defined on a subset E of \mathbb{R} . Define $\lim_{x \rightarrow p} f(x) = L$. (Be sure to tell me what kind of a thing p is, and what kind of a thing L is.)
4. Prove that if K is not a closed set \mathbb{R} , then K is not compact. (I did this in class. I am asking you to reproduce my proof, or give your own proof.)
5. Prove that $\lim_{x \rightarrow 3} 4x - 7 = 5$.
6. Let A be a set. For each $a \in A$, let E_a be an open subset of \mathbb{R} . Is the intersection $\bigcap_{a \in A} E_a$ always an open set? If your answer is yes, prove it. If your answer is no, give an example.
7. Let A be a set. For each $a \in A$, let E_a be an open subset of \mathbb{R} . Is the union $\bigcup_{a \in A} E_a$ always an open set? If your answer is yes, prove it. If your answer is no, give an example.