Math 194: Problem Set #4

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Due in 1 week.

Problem 1

Research your essay! Write a one-page introduction to the topic that is accessible to your classmates in this course.

Problem 2

Consider the following 1-paragraph badly written math statement. Write one paragraph critiquing it as though you were a grader. Then rewrite it so that it is more clear.

Let N denote the nonnegative integers, N^n denote the set of n-tuples of nonnegative integers, and $A_n = \{(a_1, ..., a_n) \in N^n : a_1 \geq \cdots \geq a_n\}$. If $C, P \subset N^n$, then $L(C, P)$ is defined to be $\{c + p_1 + \cdots + p_m : c \in C, m \geq 0, p_j \in P \text{ for } i \leq j \leq m\}$. Here is a proof that $L(C, P) \subset A_n$ implies $C, P \subset A_n$:

$$L(C, P) \subset A_n$$
$$C \subset L \text{ implies } C \subset A_n$$
$$\text{suppose } p \in P, p \notin P \text{ implies } p_i < p_j \text{ for } i < j$$
$$c + p \in L \subset A_n$$
$$\text{therefore } c_i + p_i \geq c_j + p_j \text{ but } c_i \geq c_j \geq 0, p_j \geq p_i, \text{ so } (c_i - c_j) \geq (p_j - p_i)$$
$$\text{this implies } k - 1 \geq k \cdot m; k, m \geq 1. \text{ COnttradiction}$$
$$\text{Therefore } p \in A_n.$$
$$\text{therefore } L(C, P) \subset A_n \text{ implies } C, P \subset A_n$$

Collaboration Policy

With each week's homework, you must turn in a one paragraph description of all the resources you used on that homework. You must mention any person you talked to about the problems, any book you looked at, any online resource (Wikipedia, Chegg,...) that you used. A sample paragraph is

On this week's homework, I worked on the problem set collaboratively with Gauss and Grothendieck at The Redroom during happy hour. We found an Alex Jones video (http://youtube.blah.com) that gave a really clear explanation of Fermat's Last Theorem. We compared our solutions against a solution key that we found on the /commutativealgebra/ board of 4chan (http://blah.blah.edu). We also got really stuck on Problem 5, and so we went to Chegg.com and paid an online tutor ("Zariski") $50 to solve the problem for us.