MATH 490 Name :_____

Take-home portion of Final May 3, 2016

Instructions: Below is a question for the 'take-home' portion of the final exam. Your response will make up 20 points of your final exam score.

For answering this question you may only consult your textbook and a real analysis book. If you do consult a real analysis book, you should put a citation or reference to it in your writeup. I do not think you will need to consult an abstract algebra book, but if you do that is also okay; again please include an appropriate citation.

You may not ask a question of the internet, of me, nor of your classmates or friends. Your response is the product of your own thinking and only your own thinking. Use this as an opportunity to synthesize ideas and content that you have learned this semester.

The question has three parts. You will be graded on presentation and exposition as well as on the correctness of your response and the significance of the three responses you give. 'Significance' is intentionally a subjective noun in this context; I will be judging how deep I think your response is.

Please note that the first two of the three responses is worth (a tiny bit) more than the third in case you do not think your three responses are all equally good.

This take-home portion of your exam is due at the start of our exam Tuesday, May 3 at 10:15 in our regular classroom.

1. (20 pts. – 7, 7, 6 pts.) The p-adics differ from the real numbers in many ways. Describe 3 properties, facts, or behaviors of $\mathbb{Q}_p$ that are different from $\mathbb{R}$ that you find interesting. Write a few paragraphs explaining each. Target your response to a mathematically-interested student who knows the rudiments of a real analysis course, a.k.a. an upper level mathematics major.