

MATH 240WM PROJECT 1

1. DESCRIPTION

Please upload your paper to Gradescope. For this paper, I would like you to do the following:

- (1) State and prove the Schroeder-Bernstein theorem. The statement of the theorem and hints can be found in Exercises 6 in §7 of the textbook.
- (2) Do Exercise 7 in §7 of the textbook.

Hint For each sequence of positive integers (n_1, n_2, \dots) , we define the sequence of 0's and 1's given by starting with n_1 0's then 1, and then n_2 0's then 1 etc, *i.e.*,

$$(\underbrace{0, \dots, 0}_{n_1}, 1, \underbrace{0, \dots, 0}_{n_2}, 1, \underbrace{0, \dots, 0}_{n_3}, 1, \dots).$$

The file of exercises of §7 is available on the course page.

2. EXPECTATIONS

Your paper should have a title, and the title and your name should appear on the first page, preceding any other material. Your paper should be clearly written in \LaTeX , using complete sentences and paragraphs, with displayed mathematical equations only as needed. You are encouraged to use the Definition-Theorem-Proof format common to mathematical writing (our textbook is a good example of this). Your paper should not just be a list of definitions, theorems, and proofs however – there should be writing between these components which links them. Definitions, theorems, lemmas, and corollaries should be clearly and precisely stated in mathematical language.

You should not collaborate with others on the first draft of the paper.

3. GRADING CRITERIA

- Does the paper address the mathematics correctly without major errors?
- Does the paper assume an appropriate level of knowledge and provide relevant definitions and background?
- Does the paper have an organizational structure that supports meaning and makes it easy for the reader to understand?
- Does the paper contain a minimum of sentence-level issues that impair meaning?

Generally speaking, “A” papers are those where all of the major objectives listed above are unambiguously achieved. In “B” papers, most of the major objectives have been achieved, but one or two elements need work. In “C” or “D” papers, many “C” or all “D” of the elements still require work.