# Rules for Writing Proofs in Math 320

Note:

- Newer rules supersede older ones.
- Rules posted on a given date apply to all graded work collected on or after that date.

**October 5.** From now on, the only theorems from chapters 1 and 2 that require explicit citation by name or number are:

- The Dimension Theorem (2.3)
- The Replacement Theorem (1.10)
- The Selection Theorem (1.9)

In each case, the name or number of the theorem can also be used to refer to any of its corollaries.

Other statements in the assigned sections of the book can be used without giving a theorem number, as long as your work makes clear what statement is being used.

In the future, theorems that require explicit reference by name will be indicated in lecture when they are covered, and will be added to this document.

Example of this change:

- Under previous rules you would write: "By Theorem 2.13(b), the $j^{\text{th}}$ column of $A + B$ is $(A + B)e_j$. By Theorem 2.12(a) we have $(A + B)e_j = Ae_j + Be_j$."
- Now it is acceptable to write: "The $j^{\text{th}}$ column of $A + B$ is $(A + B)e_j = Ae_j + Be_j$."

*The rules below were initially announced only in lecture, before a list of rules was added to the course web page.*

**September 19.** It is permissible to perform algebraic manipulation of an expression in a field or vector space using finite sequences of operations from the axioms (VS1-VS8, F1-F5) or Theorems 1.1 and 1.2 without listing all of the steps and without citing these axioms and theorems by number. However, some intermediate steps should be shown if a particularly long or complicated sequence of operations is necessary. Consult the proofs in the later sections of chapter 1 for examples of what is expected.

**September 7.** It is permissible to use axioms VS1 or VS2 without citing them, and to also use these two consequences of these axioms:

(1) If $v_1, \ldots, v_n$ are elements of a vector space $V$, then there is a well-defined meaning for $v_1 + \cdots + v_n$ which is independent of the way parentheses are added.
(2) The value of the sum $v_1 + \cdots + v_n$ is independent of the order of the terms.

**August 27.** The initial rules are: Every step of a proof must be justified by an explicit reference to one of the axioms (of a field or vector space) or a theorem or corollary in the textbook. Such references should include the number, e.g. "by (VS3), ..." or "by Corollary 2 of Theorem 1.10".