General protocols for writing proofs in Math 290

1. All proofs must be typeset using Latex.

2. Printed copies of the typeset text must be submitted in class on the date the proofs are due. It is also a good idea to keep electronic copies of your proofs. These can be stored on Sage Math Cloud. If you end up redoing a proof, keep track of each version, i.e. keep files called “proof1_v1.tex”, “proof1_v2.tex”, etc.

3. Try to observed the style guidelines we discussed in the handout “Writing Mathematics Well” (you’ll find a copy linked on the class webpage.) This guide applies to writing mathematics in general, whether for proofs or for more general exposition. For proof-specific guidelines, take a look at the handout “Some Remarks on Writing Mathematical Proofs”, also linked to the class webpage. Key points in all these guides:

   • Write in complete, grammatical sentences.
   • Punctuate mathematical symbols as necessary.
   • Make sure all mathematical symbols are typeset appropriately.
   • State what you are proving.
   • Make sure every line in a proof contributes to the argument.

4. For help with Latex, there are many resources available on-line. Examples include:

   • Wikibooks Latex: https://en.wikibooks.org/wiki/LaTeX A sourcebook with lots of pointers.
   • Detexify: http://detexify.kirelabs.org/ A resource for finding the Latex command to reproduce specific symbols.

   If you find other useful sites, let me know, and I will link them to the class website.

5. Specific Latex commands that will be useful for this course:

   • To typeset vectors, use symbols such \textbf{v} or \mathbf{v} to produce \vec{v} or v.
   • To typeset matrices, use

   \[
   A = \begin{bmatrix}
   a & b \\
   c & d
   \end{bmatrix}
   \]

   to produce

   \[
   A = \begin{bmatrix}
   a & b \\
   c & d
   \end{bmatrix}
   \]

   • To indicate a dot product, use $v \cdot w$ to produce $v \cdot w$.
   • To include large symbols “in-line”, use $$\text{the matrix} \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$ to yield “the matrix $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$”
• For a proof with reasons, try the \texttt{align*} environment, eg.

\begin{align*}
(x-y)^2 & = x^2 - 2xy + y^2 \\
& = x(x-2y) + y^2 \\
& = \cdots
\end{align*}
to yield

\[
(x - y)^2 = x^2 - 2xy + y^2 \\
= x(x - 2y) + y^2 \\
= \cdots
\]

• Sometimes you will generate compilation errors. To help debug these errors, it is a good idea to compile often—that way, you’ll know that if things worked a few lines ago and don’t now, the mistake must be in the last couple of lines. To further debug, comment out (via the \% sign at the beginning of a line) all the new code except for the first line or two, and recompile. Add lines in one at a time to pinpoint the source of the error.