A Sample Article for Mathematics Magazine

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This document is meant to help you prepare an Article for submission to Mathematics Magazine. Of course, editorial decisions depend entirely on what you say and how you say it. Nonetheless, we will all save time if you exercise some care in how you first present the paper.

Now that I have caught your attention with an interesting introductory paragraph, here is what you will find: specific information about the style of Articles in the Magazine and a description of the LaTeX code we prefer that you use to prepare your manuscript.

Since this section is very clearly an introduction, I thought that labeling it "Introduction" would add nothing. Note that I am willing to use the first person in an Article and you might be as well. Another equally respectable choice is "we," even when there is only one author; this can create an author-reader partnership to work through the mathematics together. Whatever voice you choose, consistency is important.

You may be looking at this document in a variety of ways: the .pdf or .ps files are meant to be viewed on a screen or printed, while the .tex file

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[1]Supported by the National Science Foundation.

[2]Authors are in alphabetical order unless there is an extraordinary reason to do otherwise. Also, the author address includes a department *only* if the department is *not* mathematics. We use as few footnotes as possible in the *Magazine*. This one, for instance, contains information that really belongs in the body of the paper. The previous footnote probably belongs among the Acknowledgments at the end.

contains the codes used to create those viewable versions via the program LaTeX. Even if you are a novice with TeX, there may be enough here to teach you what you need to know. And if you are an ace with TeX, we have a warning: please do not overload your document with special kludges and tricks that will only be removed later by our compositor.

This document is prepared with extremely simple LaTeX formatting, using the unadorned `article` template. It is designed for simplicity and ease of handling—not to imitate the MAGAZINE's final, typeset style in every detail. For authors less familiar with LaTeX, we offer a brief lesson, showing how certain common elements of mathematical style are typeset using this program. For hardcore technical specifications, please see the Electronic Publication Guidelines [7].

Notes on writing an Article

Articles in the MAGAZINE tend to be longer and more substantial than Notes, offering a broad overview of some field or making new connections. Being longer, they often benefit from more sectioning. We use the `\subsection*` command to create titles for these sections, which are not usually numbered (the `*` in `\subsection*` accomplishes this).

To judge the length of your piece, consider that this document prints to six pages with the current code, but would run about four pages in the MAGAZINE. The current settings produce a document that is generously spaced in consideration of referees' eyesight.

Few pieces of mathematical writing are entirely self-contained, although we try to make Articles reasonably so. Consider providing a section of background material that our more knowledgeable readers can skip. Define enough terms to enable an eager undergraduate student to read your piece without having to consult too many references.

For readers intrigued by your exposition, you should provide friendly references. Bibliographies may contain suggested reading along with sources actually referenced. In all cases, cite sources that are currently and readily

available.

LaTeX has a way to keep track of references automatically, which is illustrated in the code that ends this file. To refer to Halmos [3], you use a codename that you have created as a mnemonic, often the author's last name. LaTeX keeps track, numbering the references in the order they appear in your list. If you add a reference (positioning it correctly in the list) the numbers will be adjusted accordingly.

Please follow our bibliographic format carefully, based on the examples below. Entries may appear either in alphabetical order or in order of citation (but choose one order and stick to it). Journal titles are abbreviated as in *Mathematical Reviews*, for instance, *Amer. Math. Monthly*; volume numbers of journals are set in **bold**. Authors names are not inverted: Frank A. Farris, not Farris, Frank A. [2]. The abbreviation pp. is used for books, but not journal articles. Note the slightly different style for citing articles in the MAGAZINE.

How to do things in LaTeX Roman letters used as variables will be correctly italicized if enclosed with $s in your code, as in "functions f, g, and h." This makes for typing lots of $s when writing in TeX. Other popular fonts are $\mathcal{A}$, for sets and the like, and $\mathbb{Z}$ for the integers, etc.

This last symbol, the "blackboard" $\mathbb{Z}$, actually is not part of basic LaTeX. If you look in the *preamble* of this document, the part before the `\begin{document}` command, you will see the instruction `\usepackage{amssymb}`. This enables you to use the blackboard font, as well as certain special symbols:

$$\lceil\,,\rceil\,,\lfloor\,,\rfloor\,, \text{ and so on.}$$

If you do not have this package, you are welcome to mark these symbols in by hand. While we are talking about packages, please do not use any package that redefines major environments, such as the theorem environment.

LaTeX is able to number theorems automatically, using what is called a theorem *environment*. This is usually overkill for pieces in the MAGAZINE.

The following example shows a simple method for displaying theorems; the theorem need not even be numbered unless you refer to it by number later.

THEOREM 1.

Let a be any real number. Then $a^2 > -1$.

Proof. The result follows from well-known properties of flabby sheaf cohomology over algebraically closed fields. This parody of a proof, the likes of which you would not see in the MAGAZINE, ends here, but you don't need to insert an end-of-proof marker. You could put a comment in the file to mark the end of the proof.

A remarkable result that has been the target of many proofs in the MAGAZINE is the Pythagorean theorem. If a, b, and c are the sides of a right triangle, then

$$a^2 + b^2 = c^2. \tag{1}$$

The equation above is called a *displayed equation.* The reference number was added using the equation environment (enclosing the code for the equation between \begin{equation} and {\end{equation}). You should give numbers only to those equations that you cite by number later; to refer to his equation without having to remember which number it had, we gave it a descriptive label, Pythagoras, whose use is shown in the code below. The sentence ended with the equation, so we used a period.

It can be shown from equation 1, by means of a routine calculation, that $b^2 + a^2 = c^2$. Indeed, many related equations can be derived, such as these:

$$
\begin{aligned}
a^2 - c^2 &= -b^2 \\
b^2 - c^2 &= -a^2.
\end{aligned}
$$

This is an example of a LaTeX environment that you may find useful; it aligns the equations on the equals sign. The asterisk in the code \begin{eqnarray*} suppresses numbering.To display a single equation without numbering it, enclose the code in a pair of double $s, as shown below.

Another useful environment is `tabular`. Note that environments must have **begin** and **end** markers. The code that makes the brace shows how

LATEX uses the commands `\left` and `\right` to resize delimiters automatically. This also demonstrates the `\center` environment.

$$\left(\begin{array}{ccc} \text{This text} & \text{is arranged} & \text{in a table} \\ \text{with an ampersand \&} & \text{to delimit} & \text{columns} \\ \text{and double} & \text{backslashes} & \text{to end rows.} \end{array} \right)$$

The main point of your interesting Article might be illustrated by something like FIGURE 1, which I did not include in this template, partly because it's fictional, but also because I would have had to provide an additional electronic file for you to download (presumably in *encapsulated PostScript* format, eps). Figures should have brief explanatory captions, like `Figure 1 Worth 1000 words`, without a period at the end. Figures may be included in the printed output, using a package such as `epsfig`. The simplest alternative is to put the figures at the end, and note: **FIGURE 1 GOES NEAR HERE**.

In the previous paragraph, a portion of the text hangs out into the right margin. TEX did not know how to hyphenate the verbose text string. In preparing your manuscript, you do not need to worry about things like this. The line breaks will all change later anyway. There is much to say about producing figures that will look good in print. Before you invest a great deal of time creating figures, please read the detailed Electronic Production Guidelines [7]. Here, suffice it to say that we strongly prefer PostScript formats for figures. Programs such as *Maple* and *Mathematica* give you the option of saving pictures this way. *Geometer's Sketchpad* does not, but our compositor knows how to handle this type of file.

Conclusion Now replace all the text in this file with a crackling exposition of a sweeping mathematical panorama, TEX it up, and send three hard copies to:

Frank A. Farris, Editor, MATHEMATICS MAGAZINE, Santa Clara University, 500 El Camino Real, Santa Clara, CA 95053-0373

Acknowledgment   We thank our spouses, the anonymous referees, granting agencies, and our moms for everything they've done for us. If the editor helped, that's fine, but we don't thank him here since he's only doing his job.

References

[1] R.P. Boas, Can we make mathematics intelligible? *Amer. Math. Monthly* **88** (1981), 727–731.

[2] Frank Farris, *A* MATHEMATICS MAGAZINE *Retrospective*, this MAGAZINE, **79** (2006), 1-88.

[3] Paul Halmos, How to write mathematics, *Enseign. Math.* **16** (1970), 123–152. Reprinted in Halmos, *Selecta, expository writings*, Vol. 2, Springer, New York, 1983, 157–186.

[4] Andrew Hwang, Writing in the age of Latex, *AMS Notices* **42** (1995), 878–882.

[5] D.E. Knuth, T. Larrabee, and P.M. Roberts, *Mathematical Writing*, MAA Notes #14, 1989.

[6] Steven G. Krantz, *A Primer of Mathematical Writing*, American Mathematical Society, 1997.

[7] Mathematical Association of America, *Electronic Production Guidelines*, http://www.maa.org/pubs/bev.html .

[8] N. David Mermin, *Boojums All the Way Through*, Cambridge Univ. Pr., Cambridge, UK, 1990.