

Tips for Authors - J.S. Milne, Top

If you write clearly, then your readers may understand your mathematics and conclude that it isn't profound. Worse, a referee may find your errors. Here are some tips for avoiding these awful possibilities.

1. Never explain why you need all those weird conditions, or what they mean. For example, simply begin your paper with two pages of notations and conditions without explaining that they mean that the varieties you are considering have zero-dimensional boundary. In fact, never explain what you are doing, or why you are doing it. The best-written paper is one in which the reader will not discover what you have proved until he has read the whole paper, if then. [Notes](#)
2. Refer to another obscure paper for all the basic (nonstandard) definitions you use, or never explain them at all. This almost guarantees that no one will understand what you are talking about (and makes it easier to use the next tip). In particular, never explain your sign conventions --- if you do, someone may be able to prove that your signs are wrong. [Notes](#)
3. When having difficulties proving a theorem, try the method of "variation of definition"---this involves implicitly using more than one definition for a term in the course of a single proof.
4. Use c , a , b respectively to denote elements of sets A , B , C . [Notes](#)
5. When using a result in a proof, don't state the result or give a reference. In fact, try to conceal that you are even making use of a nontrivial result. [Notes](#)
6. If, in a moment of weakness, you do refer to a paper or book for a result, never say where in the paper or book the result can be found. In addition to making it difficult for the reader to find the result, this makes it almost impossible for anyone to prove that the result isn't actually there. Alternatively, instead of referring to the correct paper for a result, refer to an earlier paper, which contains only a weaker result. [Notes](#)
7. Especially in long articles or books, number your theorems, propositions, corollaries, definitions, remarks, etc. separately. That way, no reader will have the patience to track down your internal references. [Notes](#)
8. Write $A \implies B \implies C \implies D$ when you mean $(A \implies B) \implies (C \implies D)$, or $(A \implies (B \implies C)) \implies D$, or Similarly, write "If A, B, C" when you mean "If A, then B and C" or "If A and B, then C", or Also, always muddle your quantifiers. [Notes](#)
9. Begin and end sentences with symbols wherever possible. Since periods are almost invisible (and may be mistaken for a mathematical symbol), most readers won't even notice that you've started a new sentence. Also, where possible, attach superscripts signalling footnotes to mathematical symbols rather than words.
10. Write "so that" when you mean "such that" and "which" when you mean "that". Always prefer the ambiguous expression to the unambiguous and the imprecise to the precise. It is the readers task to determine what you mean; it is not yours to express it. [Notes](#)
11. If all else fails, write in German, Russian, or Turkish (or other language that most mathematicians can't read). [Notes](#)

Notes

The next quote describes the experience of someone who was hired to teach good writing to graduate students.

More serious was the repeatedly expressed longing of so many of the graduate students to possess a writing style that, far from being lucid and clear, was dense, knotted, oblique, difficult, ambiguous and verbally complex. This would make them impressive academics, worthy to be taken seriously, important, able to hold their heads high. After a year or two at this game I began to feel I was fighting a losing battle.

One morning a young woman at the front of the room raised her hand. Tentatively, but firmly, pushing her pad aside as if it were a vexing intrusion, she declared: "Everything you have said contradicts what our supervisors have told us".

The next day I quit. (TLS, April 2, 2021).

... she writes on deeply technical matters in clear English without jargon. This does not inspire confidence. Obscurity, besides obscuring incomplete thought, often suggests that the thought was quite deep.

---J.K. Galbraith.

Those who know that they are profound strive for clarity. Those who would like to seem profound strive for obscurity.

---Nietzsche.

Mathematicians always strive to confuse their audiences; where there is no confusion there is no prestige. Mathematics is prestidigitation.

---Carl Linderholm, *Mathematics Made Difficult*, p10.

Regarding (1),

A recent (published) paper had near the beginning the passage 'The object of this paper is to prove (something very important).' It transpired with great difficulty, and not till near the end, that the 'object' was an unachieved one.

---Littlewood's *Miscellany*, p57.

One ploy is to use vague vogue words. For example, if you say you "address Hilbert's n th issue" no one will know whether you are claiming to have solved Hilbert's n th problem or not.

Regarding (2),

This ploy was carried to new heights in a paper I recently reviewed: throughout the paper, including in the statement of his main theorem, the author used a term for which even he (when queried) knew of no definition.

Regarding (4),

It is said of Jordan's writings that if he had 4 things on the same footing (as a, b, c, d) they would appear as $a, M_3', \varepsilon_2, \Pi''_{1,2}$.

---Littlewood's Miscellany, p60.

Regarding (5),

It is well known that to describe a result as well-known without giving either the proof or a reference is neither pleasing nor helpful to the reader.

---J.W.P. Hirschfeld, Bull. Amer. Math. Soc. 27 (1992), p331.

well-known: known to more than a dozen people for more than two years (MR 50:2128, Roger Howe).

In his paper *The Hodge conjecture is false for trivial reasons*, Grothendieck called "well-known" a statement that was not in fact known at the time he wrote his paper. In the published version, he was able to add a footnote saying that it was now known to Deligne.

Regarding (6),

In Krantz's book *A Primer of Mathematical Writing*, p. 76, he instructs us: "do not give in-text bibliographic references that have the form 'see Dunford and Schwartz' (for those not in the know, [DS] is a three volume work totaling more than 2500 pages). The only correct and thorough way to give a reference is to cite the specific theorem or the specific page." In the *Panorama*, Krantz has neglected his own precept; none of his bibliographic references gives a page number. In particular (p. 18), after noting that "the analogue of the Hahn-Banach theorem for linear operators is false", he advises the student to look in Dunford & Schwartz for help! ... I haven't been able to find where, if at all, this question is discussed in Dunford & Schwartz...

---Stacy G. Langton in The MAA Online book review column.

Regarding (7),

One practical criticism applies to this book as well as a large part of contemporary mathematical production: the various statements are called by different names, such as Lemma, Theorem, Proposition, Corollary; the first three are numbered independently of each other, while the numbers assigned to corollaries are functions of several variables; in addition, numbered formulae have their own separate numeration. The strain placed on the reader by this partial ordering is obvious, but apparently readers seek vengeance on other readers when they turn into authors.

---I. Barsotti, MR 23#A2419.

Regarding (8),

In testifying before the House Appropriations Committee, the AMS president Felix Browder said: This poses difficult mathematical problems since *all data sets do not have similar characteristics*...

The QNS (quantifier negation syndrome) strikes again (Notices AMS, October 2000, p1041).

Compare

Not all boys like mathematics.

with

All boys do not like mathematics.

Regarding (10),

...careless use of "that" and "which" blurs the distinction between hypotheses and remarks, use of dangling participles leads to quantifiers out of order, and sloppy use of negatives and quantifiers can leave the reader totally confused.

Anthony Knapp, Notices AMS 47, no. 11 (December 2000), p. 1356.

Regarding (11),

Langlands, whose native language is English, follows this precept.

For an example of imprecise writing, see your (US) tax form, which says "combine" lines x and y when it means add lines x and y .

Compare:

A graph is r -regular if r edges e have $\text{origin}(e)=v$ for all vertices v .

(from a recent conference talk) with

A graph is r -regular if each vertex is the origin of exactly r edges.

An example of a construction to avoid:

Two women were in a SoHo boutique when they were approached by an eager salesman.
 "Ladies," he said. "If there's anything you need, I'm Nick."
 "And if we don't need anything, who are you then?" one of the "ladies" asked.

New York Times (Metropolitan Diary), July 19, 1998.

You may wish to model your exposition on that reviewed in MR2001k:11041. As the reviewer (Andrew Bremner) put it: "Spike Milligan wrote of a certain poet that he tortured the English language, yet had still not managed to reveal its meaning. Trying to fathom the paper under review is similarly frustrating. The reviewer has read through the paper several times, and on each occasion has become more and more confused."

For more tips, see: Reuben Hersh, How to do and write math research, Math. Intelligencer, 19 no2, 1997, p59.

And everyone should read George Orwell's essay *Politics and the English Language* (and try to write like Orwell). Here is a wonderful example from the essay.

I returned and saw under the sun, that the race is not to the swift, nor the battle to the strong, neither yet bread to the wise, nor yet riches to men of understanding, nor yet favour to men of skill; but time and chance happeneth to them all. (*Ecclesiastes*)

The same passage in modern English:

Objective considerations of contemporary phenomena compels the conclusion that success or failure in competitive activities exhibits no tendency to be commensurate with innate capacity, but that a considerable element of the unpredictable must invariably be taken into account.