

# Everything You Wanted to Know About Refereeing (But Were Afraid to Ask)

You have been asked to referee a paper. Congratulations! That means that somebody values your opinion. Now comes the hard part: having (and formulating) a helpful opinion. There are generally two types of reports you will get asked to do by an editor: a quick opinion or a full report. In the beginning of your career you might be asked more often for full reports, and later in your career you might be asked more often for quick opinions, but at various times you might be asked for either. Usually it's clear from the email you get which you are being asked to do (if not, ask!). I'll discuss these two main types of reports in turn.

*Quick opinions.* When an editor receives a paper from an author, usually the first step is to ask a few (between 1 and 6) experts for their quick opinion about whether the paper belongs in the given journal. In most cases, the idea is to compare the paper to other papers that have appeared in the journal recently, and to decide whether the paper in question compares favorably or not. While this is common (and reasonable) practice, the specifics of what the editor will specifically ask depend on the particular journal.

For quick opinions for *Algebraic & Geometric Topology* (where I am an editor), I ask:

1. Are the results of broad interest within the field of topology?
2. Are the results of high enough quality to justify publication in AGT?
3. Does the proof introduce original tools or ideas?
4. Does the paper compare favorably to other recent papers in AGT?
5. Is the paper likely to be referenced in the future?
6. Is the exposition of high quality?

There is no need to check for correctness, but at least check for plausibility of the theorem and approach.

If you get asked for a quick opinion, but are not given more detailed instructions, then you can answer the above questions, modified to the best of your ability for the journal in question. There is no need to answer all of the questions. Rather, these questions are intended to help the reviewer to give a thoughtful opinion.

On that note, you should never give a knee jerk reaction, or an emotional reaction, to a paper. It is important to have a reasoned approach. This requires reading the introduction carefully and scanning the rest of the paper. While I do not list it in the above set of questions, you might also consider mentioning some other reasons the journal should consider the paper, for instance if the author is in the early stages of their career, or from an under-represented group, etc.

Some journals will ask for something different than a direct comparison to recent papers in their journal. For instance, a journal might have a backlog (as many journals do these days) and they may be trying to use this as an opportunity to improve the quality of their journal. So they might ask you to compare to papers in a more highly ranked journal. Personally, I think this behavior causes confusion for authors and referees. But as a referee, you should do what is asked of you - you are working for the editor.

If you are of the opinion that the paper in question should be moved to the next stage, meaning a full referee report, then it is very helpful if you can suggest potential referees. Even better if you can supply their affiliations and/or email addresses. Also, if you are willing to referee the paper yourself, you should do so!

When you submit your report, you usually have the option of submitting a report just for the editors, for the editors and authors, or a combination of the two. It is very helpful if most of the report is visible to the authors. In some cases you might not want to do this, but if you have constructive criticism, it will help the authors a lot to see that. Of course anything compromising anonymity, such as naming potential referees, should only be sent to the editors. One positive aspect of making your comments viewable by the authors is that it can keep you, as the reviewer, more honest and thoughtful. (Sometimes your honest opinion is something that would not be helpful to the authors.)

Now, what happens with your opinion after you send it? At many journals, one negative report means rejection. The reason for this is simple. Most journals have a backlog, or at least a steady stream of strong submissions. So this approach quickly weeds out many papers with minimal work for the editor. This often is very unfair to authors, especially when the negative report was not well reasoned (or even not mathematically correct!). There are many exceptions to this rule, depending on the journal, editor, etc. A conscientious editor will be able to sniff out a negative, but not-well-reasoned, report and carefully weigh opposing views.

Because the quick opinion phase of the editorial process is harsh, a reviewer needs to really make a case for a paper in order to help it get published. Just saying that the paper is great will not be good enough for most journals. Give the reasons and comparisons.

Don't let the name fool you - the quick opinion phase can often take a few months. Various reasons include: inefficiency of the editor, inefficiency of the reviewers, declination by one or more reviewers, the need for tie breaks, etc. This problem is more for the author than the reviewer. But as a reviewer, try to keep this in mind when putting off your reviewing duties.

*Full referee reports.* If you are asked to give a full referee report, your main job is to read the paper in moderate detail, checking that the proof strategy is correct, and that there are no obvious reasons why any of the statements or proofs are incorrect. The referee is not responsible for the correctness of the paper. If there is a subtle mistake, and the paper is

wrong, it is solely the responsibility of the authors. As a referee, you can spot-check the proofs of lemmas, looking for missed cases, unsubstantiated claims, and obvious counterexamples. (Pro-tip: look for the words *clear* and *obvious* if you want to find likely candidates for mistakes.)

It does happen often that the referee will read a paper line-by-line and symbol-by-symbol. But again this is not the referee's responsibility. Overly detailed reports are perhaps one cause of inefficiency in the refereeing process.

There are many other things to look for while you are refereeing a paper, including: missed attributions and references, suggestions for improving the exposition, and of course typos.

When I write a report for the editors of a journal, this is roughly what I include:

- I state the main results as simply as I can and comment on the quality.
- I explain how the paper connects to other papers or mathematicians.
- I describe what goes into the proof and try to identify any new or unique phenomena in the theorems or the proofs.
- I identify the level of interest. Basic math objects like mapping class groups (yes, I am biased) are at level zero. The other levels are determined inductively: Torelli groups would be level one, the 5th term of the Johnson filtration would be level two, and the mod two homology of the 5th term of the Johnson filtration with twisted coefficients would be level three.
- I comment on the quality of the exposition.
- I make comparisons to other papers that were published in the same (or similar) journal on the same (or similar) subject, i.e. this paper compares favorably to these other papers that were recently published in this journal.
- Usually I give a final yes/no opinion as to whether or not I think the paper deserves publication in that journal. All of the above criteria go into this decision. Of course the level of the journal determines how good the result needs to be. If the journal is a general interest journal, I usually expect the level of interest to be zero or one. Similarly, for a top-level subject-specific journal I expect the level of interest to be between zero and two.

In short, for the editors, I try to answer the quick opinion questions discussed above.

When I write to the authors, I include the following:

- Some nice words, explaining what I like about the paper. It makes me feel good when I get a report saying that my proof is "expert" or "a tour de force" or "nicely written". I try to repay the favor, if I can do so honestly.
- Some overall comments, such as: use more signposting, avoid spaghetti code, too much notation, too sloppy, not scholarly, etc.

- Some general math questions, like why do you need this hypothesis in the main theorem, did you try to
- Line-by-line comments, i.e., Page 5, line -12: Do we need to assume the group is finitely generated here? I will also point out spelling mistakes and egregious grammar mistakes. Sometimes I have just a few comments, sometimes the comments run longer than the paper itself. Some people mark up the pdf directly - that makes it easier for the authors later. (Side note: instead of giving line numbers, which can be hard to track down later, it might be better to annotated a pdf using a tablet, or at least give different kinds of descriptors, such as: Third line of the proof of Prop 5.2.)
- I do not include any discussion of whether I think the paper is appropriate for the journal in question; I prefer to leave this part to the editors. Better to simply be constructive here.

I will end with a few FAQs (or at least questions that I imagine would be frequently asked).

*What if the paper is written very poorly?* It happens occasionally that you are asked to referee a very poorly written paper. Perhaps theorems are not clearly stated, or almost every sentence has a typo, or so many details are skipped that the arguments cannot be followed. In this case, it is reasonable to send the paper back to the editor with a short explanation as to why you were not able to fully review the paper. If you do this, it is good to show a few examples of why you made this decision. Personally I tend to be more strict with senior mathematicians, and less strict with junior mathematicians and with those for whom English is not their first language.

*Should you be secretive about your identity? Should you ever contact the author?* This is up to you. I am very strict about not revealing my identity as a referee, and there have been very few occasions in my career where a referee has revealed their identity to me. So my impression is that it is completely standard to keep anonymity.

If you for some reason really do feel like a conversation with the author would help you referee the article, or help them revise their paper, then one option is to tell them that you have been reading their paper and that you have questions. They might suspect that you are the referee, but that is different from knowing you are the referee. Similarly, I one time thought of an interesting extension of an author's theorem, and so I contacted them as a civilian to tell them my idea.

There are negative consequences to revealing yourself as a referee. Maybe the paper will get rejected eventually, or maybe the author will think your comments were too nitpicky. In this case you may jeopardize your relationship with the author. Also, even if you give a glowing report, revealing your identity also reveals your refereeing style, which you may not want to be public information.

*Should you referee for Elsevier journals?* Since I am an editor at an Elsevier journal, I am biased. However, I will do my best to give a balanced answer here. For starters, there is a boycott of Elsevier journals called The Cost of Knowledge. See Timothy Gowers' [blog post](#) and

Rob Kirby's open letter, [Comparative Prices of Math Journals](#). As explained there, Elsevier charges a lot of money for institutions to purchase their journals, and their business model involves bundling journals together, so institutions are forced to pay for journals they do not actually want. All of this is made worse by the fact that the mathematicians do all of the editorial work. Over 600 mathematicians have signed the boycott.

Here are two counterpoints to consider. The main counterpoint, already made by Gowers on his blog, is that essentially all math papers can be found on the arXiv or on the author's web site. Therefore, there is a simple way to avoid Elsevier's exorbitant prices: don't buy the journal. A responsible author will post the final LaTeX file to the arXiv, and so the only additional information in the published version is the page numbering. Most of the time we do not use page numbers in our reference, just section numbers.

Next, the market for papers is a buyer's market, in the sense that there are few quality journals, and many excellent papers. Moreover, most of the top journals have backlogs, and some even refuse new submissions for this reason. So if an author has an excellent paper that is not quite bulletproof enough for the absolute top journals, and if their field has an editor at an Elsevier journal, they may want to submit there. Especially if such an author is early in their career, we should not blame them; they need to publish in the highest ranked journal possible if they want to be competitive on the job market. If, then, the main expert in their area, who is most capable of writing a glowing opinion, refuses to give a quick opinion, that senior person is causing direct harm to the junior person.

Finally, I will point out that, according to [The Scientist](#), about 40% of the signatories to the Elsevier boycott broke their pledge within 4 years. As they write, "sticking to a boycott is much costlier for authors than it is for Elsevier."

*How quickly should you do your report?* The answer here varies. Typically the editor will give you some kind of time frame. For a quick opinion the time frame is around two weeks. For a full referee report, the time frame is often three months for short papers and six months for long papers. Very often, referees go far beyond the desired deadline. I will point out that very often the editor asking for a report is a senior person in the field, and hence someone that you might have some reason to impress. In that case, the best way to impress them is to do a super quick, and fully effective, job. If the paper is not too long, and something you are an expert in, then consider turning in a full referee report in 24 hours, for example. In the end, the amount of time you are going to spend on the paper might only be a matter of hours, so you can save yourself, the editor, and the authors a lot of waiting if you prioritize your report.

That's it for now. If you have any other questions you would like me to answer, please get in touch, and I will update this document. Good luck!