Four-and-a-half Useful Methods for assigning writing in Math Classes

Annalisa Crannell
1. **Know why you’re assigning writing.**

2. **Focus.**

3. **Distinguish between feedback and evaluation.**

4. **Batch and Automate.**

\& \(\frac{1}{2}\). **Peer Assessment.**
1. Know why you’re assigning writing.

And then let your students know why, too.
If these are your reasons . . .

*Because I have nothing better to do on a week night than sit around grading papers.*

*It will impress my dean.*

*Annalisa Crannell does it, and she’s totally awesome.*

. . . then you might want to reconsider!
Slightly better possibilities:

To help students learn to *do* mathematics, as for example with

- homework or
- journals and process papers.

To help students learn to *communicate* mathematics, as for example with

- proofs or
- research papers.

Of course, the goal is usually some combination of these two approaches.
My Calculus Writing Projects: the rationale

Why write in a math class? For most of your life so far, the only kind of writing you’ve done in math classes has been on homeworks and tests, and for most of your life you’ve explained your work to people that know more mathematics than you do (that is, to your teachers). But soon, this will change.

Now that you are taking Calculus, you know far more mathematics than the average American has ever learned—indeed, you know more mathematics than most college graduates remember. . . . It becomes increasingly important, therefore, that you can explain what you’re doing to others that might be interested: your parents, your boss, the media.
**Shahriari Shariar’s assignment:**

Get students to read the research literature in his field and tell him what it says. Oh, yeah, and introduce students to actual published research.

For this assignment, what you (the professor) do is

- photocopy the first page of papers you wish you had time to read,
  and

- dole those pages out to students.

Over the course of the semester, the students chose one paper, and then read and write summaries of the main results and significance of the papers they’ve chosen.
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& $\frac{1}{2}$ Peer Assessment.
Focus: Could shorter assignments give you the same impact?

*For example, perhaps an abstract could do the work of an entire research paper.*
Focus: Does it make sense to work on one thing at a time?

- a thesis topic,
- a partial bibliography,
- a list of mathematicians with the same last names as they have (learning to use MathSciNet),
- a vocabulary list of relevant/confusing words,
- a rough draft of an introductory paragraph,
- an outline with a revised bibliography, and then finally
- the final paper.
Focus: Does it make sense to work on one skill at a time?

- correct punctuation of math sentences,
- switching from passive voice to the “mathematician’s we”,
- including figures in formal writing,
- correct citations and reference sections,
- transitions between paragraphs, and
- other?
Focus: What does a “good” paper look like?

Write a paper yourself and observe yourself.

*How long does it take?*

*What parts of the paper are most important to you?*

*Where are your students likely to get stuck?*
Focus: What’s the difference between a “good” and “bad” paper?
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Compare math feedback & grading with the weird, foreign world of the art critique, where feedback trumps grades.
Perhaps first drafts of proofs could be feedback, not grades:

You will have two chances to turn in each homework. The first week, homework will not earn a grade unless it is essentially perfect: in this case, it will receive a grade of ‘11’. If (I should say ‘when’) your homework is returned without a grade, you have one week to revise it and turn it in again. In this case, your homework will be graded on a 10 point scale, ....
Or you can provide feedback orally. In the old days, I used to use cassette tapes. Now I use “Audacity” to make MP3’s.
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Batch and Automate

Use electronic tools in TurnItIn.com or PDFpen to create “comment stamps” for comments you make frequently on a particular assignment.

Create a solution set that includes not only correct solutions, but also common mistakes. (One of our adjuncts does this for her calculus homework and exams; students love it).

Create a “code sheet” of common mistakes. Our writing center provides one for standard writing correction marks (e.g., “ww” for “wrong word”).

Create a grading rubric. I hand these out to students before students turn in their assignments. Student use it while writing their papers, and it significantly speeds my grading.
Does this paper clearly (re)state the problem to be solved?

Does it state the answer in a complete sentence that stands on its own?

Does it state the physical formulas that underlie the formulas?

Does it define all variables used, including units of measurement?

Is the mathematics correct?
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Peer Assessment can be ... a little ... weak ...

It works best when students don’t need to make value judgements or offer opinions.

Example of a bad exercise: Ask students to decide, “Does this paper have a strong thesis?”
Tamara Goeglein’s peer-review-of-thesis exercise:

- Read the paper over carefully and then turn the paper face down.

- On the back of the page, state the thesis of the paper.

- Turn the paper right side up, and then locate and circle the sentence that give the thesis.

- Put a star next to every sentence that provides evidence for or supports the thesis.

- Put an ‘X’ next to every sentence that contradicts or distracts from the thesis.
References

http://www.theatlantic.com/education/archive/2014/02/the-wrong-way-to-teach-grammar/284014/

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[18] University of Michigan “Team Homework” site: http://instruct.math.lsa.umich.edu/support/teamhomework/
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