



**Some thoughts and advice:**

- You should expect to spend several hours writing these papers.
- Your paper should be 3-4 pages (single space) in length, excluding references.
- Each paper is worth at most: \* = 1 point; \*\* = 2 points; \*\*\* = 3 points.
- To receive full credit your paper must:
  - **be original work;**
  - **cite > 1 distinct sources (unless otherwise specified);**
  - **be well-referenced;**
  - **be mathematically correct;**
  - **exhibit skillful and appropriate vocabulary;**
  - **be grammatically correct;**
  - **be well-organised.**
- Use of diagrams, visuals, graphs, portraits etc. is encouraged.
- Ability to explain an argument in down-to-earth terms (e.g. using diagrams to express your argument) carries more weight than a technical mathematical argument.
- You are allowed to discuss your paper with each other but you must write up your paper on your own.
- If you are having trouble locating a source then let me know.
- If you are concerned about the appropriateness of a source then you are welcome to ask me.

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1. \*\*\* Write a response to the following statement:

*“Mathematics is a Creative Art”*

Some resources that you may find useful are

- <https://hackernoon.com/mathematics-is-art-all-the-mathematicians-say-so-d0d569f89976>
  - A Mathematician’s Apology, G. H. Hardy
  - Mathematics is a Creative Art, P. Halmos (easily found online)
  - Why Writers Should Learn Math, A. Nazaryan (New Yorker article available in PDF from me)
  - Two Views: How Much Math do Scientists Need? <http://www.ams.org/notices/201307/rnoti-p837.pdf>
2. \*\* Write an extended resume/biography for one of the following mathematicians:
- (a) Gauss

(b) Riemann

(c) Newton

Your resume/biography should include:

- personal background e.g. education
- a discussion of at least two mathematical contributions
- at least two interesting facts/stories
- individual creativity
- consist of at least three different sources.

Information about these mathematicians might be found in *God Created the Integers*, Hawking (available electronically through Davis Library), *Men of Mathematics*, E.T. Bell, *Mathematics and Its History*, Stillwell, and the World Wide Web.

3. \*\*\* Expectations in College-Level Mathematics Courses

(a) **First:** Write a reflection on your **expectations** in post-Calculus sequence (i.e. 200-level and beyond at Middlebury) college-level mathematics course: *What do you expect to learn in class? How do you expect to be taught in the course? What do you expect to take away from the course? What do you expect from the course instructor?*

(b) **Second:** Read Weber's article (referenced below) on *Expectations of Lectures in Advanced Mathematics*, and compare and contrast with your own expectations. *Does Weber's article change your expectations in any way? Does Weber's article support your expectations in any way? Does Weber's article provide insight into the college-level mathematics courses you've taken? Does Weber's article invoke any strong feelings towards your own college-level mathematics education?*

- *Mathematics Professors and Mathematics Majors' Expectations of Lectures in Advanced Mathematics*, K. Weber. American Mathematical Society Blog, February 10, 2015. (*Available on course website*)

(c) **Third:** what do you think could be done to better align students' and professors' expectations in mathematics courses?

4. \*\* Write a summary of the talk *A History of Vector Analysis*, by M. J. Crowe (available at the course website).