

PORTFOLIO REQUIREMENT FOR MATH 390

FALL 2014

In order to complete your secondary teaching track major in mathematics or the foundational level mathematics waiver program, you must create a Mathematics Portfolio. **You will begin compiling the portfolio in Math 390 by writing three entries, which you must save to resubmit in Math 490.** You should continue collecting artifacts and writing entries throughout your program, then complete the portfolio and present it for evaluation in Math 490, which must be taken in the last year of your undergraduate program. Successful presentation of the portfolio is an exit requirement from the Mathematics Major — Secondary Teaching Track and from the Foundational Level Mathematics Waiver Program.

Purposes

The main formative, or educational, purposes of the portfolio are for you to synthesize what you have learned about content and mathematical practices, and reflect on the significance of your learning and its application to your future career as a teacher. The main summative, or evaluative, purpose of the portfolio is to assure the faculty that students completing either the Mathematics Subject Matter Program [the Secondary Teaching Track] or the Foundational Level Mathematics Waiver Program are knowledgeable in undergraduate-level mathematics content and aware of its relevance to secondary teaching.

Each entry should be at least 2-3 word-processed pages in length and should be written neatly to collegiate standards with correct grammar and spelling. **The three required entries for Math 390 are (1) one content domain entry demonstrating how the content from one or more of your current or previous collegiate mathematics courses will inform and strengthen your future teaching of the mathematics curriculum in middle or high school; (2) the Reasoning and Explaining mathematical practice domain entry; and (3) your beginning philosophy for teaching mathematics.** These entries must be retained to resubmit in Math 490; you should be collecting artifacts and ideas for the remaining entries throughout your SSU mathematics career, finalizing them during Math 490 in your Senior year.

Contents and Structure of Finished Portfolio

Your completed Math 490 portfolio must include all of the following clearly labeled categories.

1. Table of Contents
2. **My Philosophy for Teaching Mathematics: Beginning of Program [390 required]** 490 requires a finished copy of this for the final portfolio.
3. Content Domains: **390 requires one of the five content entries bolded below.** 490 requires a finished copy of that one for the final portfolio and your choice of 3 of the remaining 4, for a total of 4 content domains [as well as the other entries described above and below]
 - Number and Quantity
 - Algebra
 - Functions
 - Geometry
 - Statistics and Probability
4. Mathematical Practice Domains: **390 requires entry b) below.** 490 requires a finished copy of that entry for the final portfolio and your choice of a second mathematical practice domain entry [as well as the other entries described above and below]
 - a) Overarching habits of mind of a productive mathematical thinker:
 - Make sense of problems and persevere in solving them (SMP 1)
 - Attend to precision (SMP 6)
 - b) **Reasoning and Explaining [required in 390]**
 - Reason abstractly and quantitatively (SMP 2)
 - Construct viable argument and critique the reasoning of others (SMP 3)
 - c) Modeling using tools

- Model with mathematics (SMP 4)
- Use appropriate tools strategically (SMP 5)
- d) Seeing structure and generalizing
 - Look for and make use of structure (SMP 7)
 - Look for and express regularity in repeated reasoning (SMP 8)

5. My Philosophy for Teaching Mathematics: End of Program

9. Summary Reflection

The portfolio requirement changes periodically. You should keep a copy of this description with your completed 390 entries, as you will need the entries again [including artifacts described below] as part of your completed 490 portfolio. Keep this description as evidence of portfolio expectations since any later revisions should not apply to you. As long as you successfully complete 390 with these expectations, they will become the basis for your 490 requirements. Throughout the rest of your major coursework, be thinking about how your coursework prepares you for future teaching, and collect artifacts from your classes, so that you will be prepared to write the remaining 490 entries when you take that Capstone Course in your Senior year.

Here is a more detailed description of what is expected in each of these domains.

Philosophies for Teaching Mathematics: These expositions should draw on your experiences as an observer of middle and high school mathematics teaching and your work with students of that age, as well as your own experiences as a student of mathematics. Each of these portfolio entries should be at least two to three pages long, although they may be longer. The **Beginning Philosophy for Teaching Mathematics [390 required]** will be evaluated on:

- Depth of thought — Is it based on some combination of observation, theory, and personal experience? Does it demonstrate analysis and reflection?
- Mathematical relevance — Does it address aspects of teaching mathematics, not just teaching in general?
- Rationale and coherence — Is the piece well organized and coherent? Does the exposition flow smoothly? Are claims or conjectures supported by evidence, examples, or arguments? Are the ideas consistent, or if not, are inconsistencies or ambiguities articulated as such?
- Writing quality — Is the writing clear and grammatically correct, with proper spelling, punctuation, and diction?
- The Ending Philosophy for Teaching Mathematics [for Math 490] will be evaluated on the above qualities and also on:
- Evidence of growth — Does the piece show evidence of your learning and growth regarding mathematics education over the course of your Subject Matter Program?

Content Domains: In each of these domains, **including the one content domain required for Math 390** [the others should be drafted over your SSU career so that you can finalize them in Math 490], your portfolio **must include** an artifact that demonstrates important ideas and processes in that domain.

1. First think deeply about how your learning in your collegiate mathematics courses will impact your future teaching. Study connections between what you have been learning and what you will soon be teaching, with an emphasis on drawing on your new knowledge to inform your future teaching. As an example, I encourage you to look at www.smcm.edu/mathcs/rmtalbot2005. This webpage was designed by a student to connect what she learned in her Abstract Algebra class to high school mathematics and is an outstanding example of connections, although it does not take the next critical step of elucidating the impacts that her Abstract Algebra course will have on her teaching.

2. Then look for your personal artifact(s) from your coursework at Sonoma State or transfer college. Individual artifacts might be a paper or project you've written, a homework assignment or exam you've completed, or a single problem solution you produced or a question you explored or a photo of some project that you created. You do not have to showcase your best work at SSU; it is entirely acceptable to present a failure that became a turning point in your thinking or to show a reworking of an activity or exam where you learned from that revision. The artifacts should involve you in some significant way as a learner. Copies of the appropriate artifact(s) must be submitted with each entry.
3. Then write a 2-3 page reflection that builds on your artifact(s) and the connections you have made between your own learning and the content you will be teaching in middle or high school. The reflection must include: a) a description of each artifact and the important ideas and/or processes it represents for your own learning of mathematics; and b) describes the relevance of the artifact(s) to the connection between collegiate mathematics and your teaching of secondary mathematics. Only one reflection is required for each domain (say, Geometry), not separate reflections for each artifact if you have more than one.

Each of the Content Domains will be evaluated on:

- Examples with reflection on your own learning — Are the artifacts appropriate and significant for the domain? Do they demonstrate some aspect of your learning? Does the reflection explain these points adequately?
- Connections with secondary level mathematics teaching — Does the reflection explain connections between what you are learning through university coursework in this domain and how you will use this knowledge in teaching mathematics in secondary school? Is the reflection grounded in specifics about secondary school content from your observation or reading about secondary education?

Mathematical Practice Domains: In each of these domains, **including the one required for Math 390**

[you should be thinking about the others throughout your SSU career so that you can write one of your choice in Math 490], your portfolio must include either an artifact from your own collegiate mathematics learning that demonstrates important ideas in that domain or specific references to readings from the Math 390 or 490 course that are linked to your learning, or both.

Then write a 2-3 page reflection that builds on your readings and/or artifact and the connections between mathematical practices from your own learning and the mathematical practices you will be helping students to develop in middle or high school. Each domain includes two related Standards for Mathematical Practice from the Common Core State Standards; your entry can focus on one more than the other, but should address both.

Each of the Mathematical Practice Domains will be evaluated on:

- The quality of the description of your artifact and/or specific details from your readings — Are the artifacts/details appropriate and significant for the domain? Do they demonstrate some aspect of your learning? Does the reflection explain these points adequately?
- Connections with secondary level mathematics teaching — Does the reflection explain connections between what you are learning through university coursework in this domain and how you will use this knowledge in teaching mathematics in secondary school? Is the reflection grounded in specifics about secondary school content and practices from your observation or reading about secondary education?

Summary Reflection: [for Math 490] This should look back across your learning and experience overall in the program and also look ahead to mathematics teaching as a career. The reflection should address three areas: a) Mathematics — What have you learned about the field of mathematics as a discipline? What are your mathematical strengths and weaknesses? What aspects of mathematics do you like or dislike, and why? Other thoughts? b) Career — What path do you project for your career at this point? How has your experience at Sonoma State changed, reinforced, or informed this choice? Other thoughts? c) Portfolio —

To what extent and in what ways was creating this portfolio a worthwhile task for you? What aspects did you like or dislike, and why? Other thoughts?

The Summary Reflection will be evaluated on:

- Depth of thought — Is it based on some combination of observation, theory, and personal experience? Does it demonstrate analysis and reflection?
- Rationale and coherence — Is the piece well organized and coherent? Does the exposition flow smoothly? Are general ideas supported by evidence, examples, or arguments? Are the ideas consistent, or if not, are inconsistencies or ambiguities articulated as such?
- Evidence of synthesis — Does the reflection draw on the range of portfolio domains and contents? Does it connect them in meaningful ways to derive a bigger picture?

Presentation

All portfolio contents must meet college-level standards of writing (i.e., well organized; clear; correct in grammar, spelling and diction; neat). Your expositions and reflections must be word-processed, but the format of the artifacts may vary. You are encouraged to be creative in design and appearance, within the structural guidelines above. Your portfolio may be bound or assembled in a 3-ring binder. In MATH 490, all portfolios will be submitted for final assessment.

Each of your entries in your portfolio will be judged as either meeting expectations or needing revision. In rare instances, outstanding elements may be judged to exceed expectations. **To receive a grade of Credit for Math 390, your beginning philosophy for teaching mathematics and your content domain and mathematical practice domain entries must all meet expectations.** In order to receive credit for the course, any entry that does not meet expectations must be revised for resubmission until it does meet expectations. Similarly, in Math 490, a passing portfolio in which all entries meet expectations is required for a grade of Credit in Math 490 and successful completion of the Mathematics Subject Matter Program.