

## Overview of the Portfolio for the Single Subject Program in Mathematics

Your portfolio for the Single Subject Program in Mathematics is a chance to showcase your knowledge of mathematics and your readiness to teach math at the High School level.

Your portfolio should demonstrate to us three things:

- Your command of the mathematics content required by the State of California
- Your understanding of the skills and abilities required to reason mathematically
- You have the field experience necessary to make an informed decision about entering the teaching profession

### Mathematics Content:

In order to make your case as effectively as possible, your portfolio must contain work samples that demonstrate knowledge and competency in each of the following mathematical areas

1. Algebra
2. Geometry
3. Probability and Statistics
4. Number Theory
5. Calculus
6. History of Mathematics (including History of Calculus Essay)

In addition, your work samples must demonstrate your ability to

1. employ technology to assist in problem solving (e.g. graphing calculator, Maple, Excel, or Geometer's Sketchpad)
2. communicate mathematics formally  
(i.e. present formal written proofs from most of the mathematical areas above, including a written formal proof of the Rational Root Theorem, the Fundamental Theorem of Algebra, the Quadratic Formula, or the Conjugate Root Theorem. This is also a good place to include one of your perfect proofs from Number Theory)
3. solve a problem in multiple ways (e.g. graphical vs algebraic solutions, exact vs. numerical approximation)
4. make connections across different mathematical content areas
5. make connections between mathematics and other disciplines
6. formulate and test conjectures

The same work sample may demonstrate multiple skills. You should be explicit in your portfolio about what each work sample demonstrates. The State Standards are available on the Math Department website.

### Field Experience/Education Content:

As part of the Single Subject program in Mathematics at CLU, you are required to have Field Experience (Educ 362, class observations and tutoring in CLU's Math Lab). Your portfolio should include reflections on this experience and may include excerpts from a journal. In addition you will need to include three essays: one on Multiculturalism and Ethnicity in Mathematics, one on Historical Perspectives in Mathematics, and one on Gender Issues in Mathematics. The guidelines for these essays are included at the end of this document.

### General Logistics

All portfolios should be contained in a 3 ring binder and be prefaced by a Table of Contents. There are certain items that your portfolio must contain. Other items can and should be included to create a more representative portfolio. Below is a list of items to consider including in the portfolio. Those items that are required to be present in your portfolio are marked with a \*. This document and Form A are available on the Math Department's web page: <http://www.clunet.edu/Math> under **Programs>Single Subject>Requirements**.

Portfolios are due by the *last day to drop a class*. Minor additions can be made to the portfolio until Honor's Day. Portfolios and additions can be given to **Vicki Wright in ASCI 102** if Dr. King is not around.

Spring defenses will be scheduled during the last week of classes. If you are finishing your program in the Spring, be sure you **notify Dr. King (hking@clunet.edu) by March 1** so that a defense time can be scheduled for you.

## Sample Portfolio Contents

- A. \*Course Requirements (Form A.)
- B. Reflection on growth in mathematics:
  - In what course did you learn the most and why?
  - Compare and contrast: Algebra and Linear Algebra, or  
Calculus and Real Analysis
  - For what course are you most proud of your work and why?
  - What course would you have liked to be offered at CLU?
- C. \*Course work samples:
  - Include work from at least 5 courses, including 1 lower division, 2 upper division, and your capstone project. Each sample should be preceded by an explanation of the work and a rationale for its inclusion. Suggestion: include work that details one of your strengths, and /or demonstrates progress made on a difficult topic.
- D. \*Formal Proofs from at least 4 of the 6 content areas
- E. \*Essay on Multiculturalism and Ethnicity in Mathematics (see prompt)
- F. \*Essay on Gender Issues(see prompt)
- G. \*Essay on the Historical Perspectives in Mathematics (see prompt)
- H. Reflections on the field experience/excerpt from journal (if kept)

### Sample Timeline for Completing Portfolio Items

	Fall	Spring
1 <sup>st</sup> year		Historical Perspectives Essay* (while in Calc I or Calc II) Field Studies Entry (while in Education 362)
2 <sup>nd</sup> year	Technology Sample(from Calc sequence) Algebra proof (while in Math 492) <b>Entrance Interview*</b>	Mathematical Autobiography <b>Review of portfolio materials in Advising Session</b>
3 <sup>rd</sup> year	Gender Essay (while in Math 382) Number Theory Perfect Proof Formulating and testing conjectures sample	Geometry sample Additional History Sample <b>Review of Portfolio in Advising Session</b>
4 <sup>th</sup> year	Multicultural Essay Probability and Statistics Work Sample 2 <sup>nd</sup> technology sample	Samples demonstrating connections between topics (here or while taking Math 420/425) <b>Portfolio Submission and Defense</b>

\*Entrance Interview and Historical Perspectives Essay are required for those Graduating Spring 2009 or later.

Those items that are required to be present in your portfolio are marked with a \*. The others are recommended items.

## Report on Gender Issues in Mathematics

### Assessment Criteria (Form I)

Students in the Subject Matter Program in Mathematics must complete a report on a seminar addressing gender issues in mathematics. These seminars will be sponsored by the CLU Women's Resource Center or the department\*. The purpose of the report is to assess the student's understanding and appreciation of gender-related issues in mathematics.

As a minimum, the report should be

1. typed and double-spaced
2. a minimum of 750 words
3. written using appropriate citation (e.g., MLA) methods
4. for a mathematics-interested audience but with no specific mathematics background.

The report will be evaluated on the basis of the following criteria:

1. Does the report discuss the key gender issues of the seminar?
2. Does the author demonstrate an understanding and appreciation of gender issues and their relationship to mathematics?
3. Is there a meaningful discussion or reflection on the issues of gender and mathematics as presented in the seminar?
4. Has the seminar led the student to identify subsequent gender-related issues?
5. Is the report organized and well-written?

\* If no seminar has been given, the essay may be based on presentations in Math 382 or 381 and/or readings.

## Essay on Multiculturalism and Ethnicity in Mathematics

### Assessment Criteria (Form H)

Students in the single subject program are required to complete an essay on multiculturalism and ethnicity in mathematics. The purpose of the essay is to effect a deeper understanding of how cultural or ethnic issues relate to the learning or accomplishment of mathematics. Since the issues are quite varied, it is intentional that the assignment be broad and not prescriptive. It is hoped that students will address a topic that is both interesting and relevant while enlarging their perspective.

As a minimum, the essay should be

1. typed and double-spaced
2. a minimum of 1000 words
3. written using appropriate citation (e.g., MLA) methods
4. for a mathematics-interested audience but with no specific mathematics background.

The essay will be evaluated on the basis of the following criteria:

1. Does the essay relate cultural or ethnic issues to mathematics?
2. Does the author demonstrate an understanding and appreciation of the cultural dimensions and context of mathematics as an area of study?
3. Is there a meaningful discussion of how diverse backgrounds relate to mathematics?
4. Does the author reflect on the contributions and perspectives of diverse cultural or ethnic groups in mathematics?
5. Are the key ideas conveyed in an organized manner?
6. Are any assertions supported by reasoning, examples, or citations?

## Report on Historical Perspectives in Mathematics

### Assessment Criteria

Students in the Subject Matter Program in Mathematics must complete a report on an issue of historical significance within the field of mathematics. Students can choose a topic from several covered in the textbook (*Calculus, Early Transcendentals*, James Stewart) or develop a thesis independent of the textbook, with the approval of the instructor. The purpose of the report is to assess the student's understanding of the interconnectedness of topics in mathematics from an historical perspective.

The pre-approved topics selected from the textbook are

1. *Early Methods for Finding Tangents*, pp. 164-165
2. *The Origins of L'Hospital's Rule*, p. 315
3. *Newton, Leibniz, and the Invention of Calculus*, pp. 413-414

The report must meet the following basic requirements to be accepted:

1. typed and double-spaced
2. a minimum of 750 words
3. written using appropriate citation methods (*e.g.*, MLA)
4. written for a mathematics-interested audience, but with no specific mathematics background.

The report will be further evaluated on the basis of the following criteria:

1. Is the report organized and well-written?
2. Does the report discuss the key issues in the chosen historical topic?
3. Does the author demonstrate an understanding and appreciation of the covered field of mathematics from an historical perspective?
4. Is there a meaningful discussion or reflection on the historical development of the field of mathematics that forms the basis of the report?