Math4010 Portfolio Assignment

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Objectives for Portfolio: The student will

- See an overview of what was learned in this semester.
- Have examples to use when teaching children.
- Reflect on the material covered in this course.
- Have a model of a good assessment tool.

PORTFOLIO REQUIREMENTS:

- Utah State Mathematics Core Curriculum for grades K-6 (10%)

- Problem Solving (10%)
  - Polya's steps for problem solving
  - List strategies for problem solving
  - Include three problems (and their solutions) that you liked or found interesting and explain why you liked the problems

- Number Systems (15%)
  - Sample Venn Diagrams and problems relating to them; include at least these
    - $A \cap B$ (A intersect B)
    - $A \cup B$ (A union B)
    - $A - B$ (A subtract B)
    - $\overline{A} = A^{C}$ (A complement)
  - Venn Diagram of the Real number system showing natural numbers, whole numbers, integers, fractions, rational and irrational numbers
  - Flow chart of the number systems with all algebraic properties associated with each number system

- Number Concepts (15%)
  - Different historical number systems and their properties (lead up to our number system)
  - Explain historically why they were developed
  - Illustrate the understanding of numbers across grade levels (e.g. what is a number? How do kids think about or perceive numbers and how does that understanding progress through elementary school from whole numbers to fractions to integers, etc.?)

- Operations (20%)
  - Order of Operations (include examples)
  - Show several models for each arithmetic operation (addition, subtraction, multiplication, division) with
    - Whole numbers (do some examples with bases other than base 10)
    - Fractions/decimals
    - Integers
    - Real Numbers
  - Mental Math strategies
  - In-depth portfolio problem (in one of the homework assignments)

- Investigations (15%)
  - Factors
  - LCM (methods and examples)
  - GCF (methods and examples)
  - Prime numbers
  - Divisibility Tests (include examples)
  - Rules of Exponents (include examples)
  - Absolute Value (include examples)
  - Mathematical Questions: give thorough explanations or proofs of all of these.
    - Why can't we divide by zero?
    - How are you sure $\sqrt{2}$ is irrational?
    - How do we know there are infinitely many prime numbers?
    - Why can we invert and multiply?

- Reflections (10%)
  - From all homework assignments
  - Final Reflection: Describe your learning from this semester (in this class). What do you understand better now than when the semester began? What did you learn that seemed new to you? What did you learn that will benefit you as a teacher?
  - Practicum Report

- Additional Items (5%)
  - Graph Paper Fraction book
  - List of math reading books for the elementary classroom
  - Any additional items you'd like to include