

# Study Guide for Exam 1

## Sets

1. Be able to describe sets with word descriptions, listing in braces, and set builder notation.
2. Definitions
  - complement
  - subset
  - intersection
  - union
  - disjoint
  - finite and infinite
  - one-to-one correspondence
  - equivalent sets
  - $a$  is less than  $b$
3. Be able to set up and solve problems with Venn diagrams.

## Conceptual Models

You will need to be able to identify each different model, be able to formulate problems which illustrate each model, and be able to discuss benefits and drawbacks.

1. Addition Models
  - Set Model
  - Measurement Model
2. Subtraction Models
  - Take-away
  - Missing Addend

- Comparison
- Number-line (Measurement)

### 3. Multiplication Models

- Repeated Addition
- Array Model
- Rectangular Area
- Multiplication Tree
- Cartesian Product

### 4. Division Models

- Repeated-Subtraction
- Partition
- Missing Factor

## Algorithms

You will need a clear understanding of Exchange. You need to understand how each step in the development of the algorithm works and how they lead to the final algorithm.

#### 1. Addition Algorithm

- Units, Strips, and Mats
- Place-Value Cards
- Instructional Algorithm
- Final Algorithm

#### 2. Subtraction Algorithm

- Units, Strips, and Mats
- Place-Value Cards
- Instructional Algorithm
- Final Algorithm

### 3. Multiplication Algorithm

- Units, Strips, and Mats
- Place-Value Cards
- Expanded Form
- Instructional Algorithm
- Final Algorithm

### 4. Division Algorithm

- “Multiples”
- “Short-cut”
- Scaffold
- Standard Algorithm

### **Other**

1. NCTM Principles and Standards
2. Be able to solve problems with exponents
3. Be able to do conversions from base ten to base  $n$  and vice versa. Be able to add and subtract in bases other than ten.