

Study Guide for Test 2

Test Date: 11/6/08

Math 181 with Joe Champion

1. Density of the Rational Numbers:
 - a. Know that rational numbers are *dense* because a rational number always exists between any other two rational numbers. The whole numbers and the integers are not dense.
 - b. Be able to find rational numbers between any other two rational numbers.
2. Fractions:
 - a. Be able to compare and order fractions and justify the ordering using your knowledge of the size of the fractions, benchmarks, and equivalence of fractions.
3. Representing Decimals:
 - a. Be able to represent, order, and compare decimals with the number line, and base ten pieces in which the value of a unit may change (e.g., setting a cube to equal 10 means a unit equals what?).
 - b. Be able to represent the location of number in decimal notation on the number line using successive “zooming”
4. Addition, Subtraction, and Multiplication with Whole Numbers:
 - a. Know that operations are mathematical processes that combine two or more numbers. The four basic arithmetic operations are addition, subtraction, multiplication, and division.
 - b. Be able to represent adding, subtracting, and multiplying whole numbers with base ten pieces. For example, illustrate the standard algorithms for addition and subtraction and base ten blocks.
 - c. Relate the area model of multiplication with the partial products method for multiplication.
 - d. Realize that multiple methods exist for adding, subtracting, and multiplying numbers. These algorithms for computation are not just based on meaningless rules and procedures. Rather, they rely upon sensible ways of composing (grouping together) and decomposing (breaking apart) numbers.
 - e. Be able to explain at least three reasons why alternative algorithms can be beneficial for elementary students learning operations of whole numbers.
 - f. Be able to develop, interpret, utilize, replicate, and evaluate for generalizability and efficiency standard and alternative algorithms for addition, subtraction, and multiplication.
 - g. Recognize that the Fundamental Counting Principle is another way to represent multiplication, i.e., if an event E can occur in e ways, and after it has occurred, an event F can occur in f ways, then event E followed by event F can occur in $e \times f$ ways. Be able to solve such problems using multiplication with a tree diagram, a table, and an organized list.
5. Addition and Subtraction with Positive and Negative Numbers:
 - a. Represent adding and subtracting integers with two-color counters, the chef story, and the number line.
 - b. Know and be able to illustrate why subtracting a negative number has the same result as adding that number using both the chef story and the number line.
6. Addition and Subtraction Word Problems:
 - a. Know that solving word problems is based on understanding the relationship between the numbers involved rather than based on cue words in the problem.
 - b. Write, identify, and solve different types of word problems according to the Taxonomy for Addition and Subtraction Word Problems.
7. Student Presentations
 - a. Be able to explain three things you learned from the student presentations, including at least two things you learned from someone else’s presentation.
8. Estimation
 - a. Be able to develop a well-reasoned estimate for a poorly posed arithmetic problem (e.g., how many raisins would fit on your teacher’s desk?)