

Whole Number Arithmetic Scenarios, Terms, and Definitions:

1. As in HW, create, explain example sets to demonstrate set-based definitions from the Definition Summary.
 - (a) Explanations MUST clearly point out the link between each original or answer set and the original or answer numbers in the computation. Be VERY thorough!
2. Complete statements to illustrate constructivist definitions, as in HW.
3. Know when division involving 0 is possible/not; use PRECISE definitions to explain.
4. Given a number sentence or just a list of 3 numbers, write the associated Fact Family.
5. Memorize and spell the terminology for parts of number sentences.
6. Create number sentences having given numbers in specified roles; recognize when you cannot.
7. Create whole number sentences w/more general constraints, explain impossibles, as in HW, quiz.
8. Memorize names of the scenarios for each operation listed in the Scenario Summary.
9. Identify by name the scenario and/or operation represented in a given word problem.
10. Write the complete number sentence represented in a given word problem.
11. Make up an original word problem requiring a given computation and scenario.
12. Distinguish between “objects” vs. “measurements” in reading or writing a word problem.

Numeration and Place Value:

1. CLEARLY explain: (1) difference between number and numeral, (2) meaning of phrase “place value.”
2. Tell what the phrase “numeration system” means; correctly spell the name for ours.
3. Convert between forms for base ten numerals: standard, word, all three types of expanded.
4. Answer questions like those in HW #21.
5. Find one or more base ten numerals that satisfy a given set of clues.
6. Write in words the names of the first four or five positions in an unusual base.
7. Convert a number written in another base into what it’s worth in base ten.
8. Given an equality using numerals in base ten and in an unknown base, find the value of the base.
9. Count in bases other than ten; memorize the extra digits in bases twelve and sixteen.
10. Prepare to work in *unfamiliar* other bases such as eleven, thirteen, etc. I will give you necessary extra digits or the pattern for creating them (as in the base eighteen quiz problem).
11. Explain THE MATH for why bases such as twelve need extra digits. (Blank rules such as “You’re supposed to use T for ten” are NOT good enough.)
12. Explain THE MATH for why the base itself is never written as just a single digit. (“You’re not allowed to write a 4 in base four” is NOT good enough.)
13. Beware creating numerals that use inappropriate digits for their bases.
14. List one or several numerals that precede or follow given numerals in a specific base.
15. Determine largest or smallest in a list of numerals, possibly in a mixture of bases. (See text HW.)

Whole Number Arithmetic Algorithms:

1. Explain what the words algorithm, manipulative mean.
2. Describe how to use base blocks to work a given addition or subtraction in a specific base.
3. You MUST explain trades explicitly - how many of one shape trade for another - to earn full credit (“I traded 5 longs for 1 flat,” NOT “I traded the/some longs ...,” and “I broke/traded 1 long into 7 units,” NOT “I broke the long up to get units...,” etc.)
4. Add entirely in a specific base MY choice of using the standard or Scratch Addition algorithms.
5. Subtract in a specific base using MY choice of the standard or Balancing algorithms.
6. Remember that I am grading your perfect performance of the ALGORITHM, not whether you can merely find the answer by some method/scratchwork of your own.
7. Prepare for problems of the form $2000 - 345$, showing perfect scratchwork.
8. Add, subtract real-life measurements in non-base ten settings. (See 3-4A, 3-4B #14 or make up your own examples using inches-feet-yards, ounces-pounds, time, etc. You needn’t memorize measurement relationships: I’ll give you correct conversions on the exam.)

You will need an approved calculator for use on the exam.