

Each exam's Topics/Objectives List tells what I'll expect of you on that exam, and gives an outline for creating your own, detailed study guide. Compare the list to your notes, in-class materials, reading, on-line links, Bonus Study Prompts, Weekly Assessments, Required Practice, and extra problems - you might want to recopy key definitions and explanations, rewrite thorough examples of tasks and solutions, jot down warnings of what not to do, etc. Strive to master concepts, explanations, and computational techniques in general; memorizing specific examples is seldom successful.

**Problem Solving:** Know that true problem solving involves new or unfamiliar situations. Don't panic!

1. Identify a given explanation as telling how (giving a process) versus telling why (giving reasons) versus doing neither, and explain your choice. Avoid tangling these in your own explanations.
2. State Polya's Four Steps in order. Spell his name. Know we use the Steps for problem solving.
3. Expand on each step by giving 1-2 additional issues involved in or needed for that step.
4. Identify which step seems most involved in a short problem-solving story, and why you think so.
5. Memorize strategy names and full characteristics from Summary #1. Use them for:
  - (a) Given a problem, name several strategies that might/might NOT work in solving it.
  - (b) Identify key characteristics of the problem to justify your strategy. That is, tell WHY to choose the strategy (what it is about the problem that fits the strategy), not HOW to use it.
6. Solve a problem, possibly unfamiliar; I may require a certain method vs. leave the choice to you.
7. Tables/diagrams/pictures/variables need clear labels.
8. Guess and Check should use and explain improved guesses.
9. Practice flexibility - use new "tricks" you've seen - but prepare for VARIABLES to be forbidden.
10. Demonstrating/assessing your problem solving skills by definition involves new, unfamiliar situations, not just tasks you've seen in class; don't let that unfamiliarity scare or intimidate you.
11. Just your use of Polya's steps counts for a lot.
12. Draw, fully label Work Backwards diagrams when asked. Don't confuse fractions kept vs gone.
13. Use your choice of method to solve fraction problems like the 5th grade Unit Fraction handout.

**Sequences:** Algebra/variables - other than  $a_1$ ,  $a_2$ , etc. - will not be permitted in sequence problems.

1. Find next or early term(s) in a given sequence of numbers, diagrams, etc. Explain when asked.
2. Give clear, meaningful VERBAL definitions for each of the five special types of sequences.
3. Classify given sequences: arithmetic, geometric, Fibonacci-type, repeating, or no special type.
4. Show the difference sequence for a given sequence, or make up a sequence if I give you its difference sequence.
5. Explain in a sentence what the term common difference (CD) or common ratio (CR) means.
6. Identify CD or CR of a given arithmetic or geometric sequence.
7. Sequences may use decimals, fractions, or negative numbers in general, or as CDs and CRs.
8. Make up arithmetic, geometric, or Fibonacci-type sequences satisfying given verbal information.
9. Find distant terms for arithmetic or repeating sequences. Prepare to explain, if asked.

(continued on back)

**Algebra for Teachers:** Explain clearly - in sentences - the steps in the Order of Operations.

1. Identify a given example as an equation, a number sentence, or an expression.
2. Give your own examples of equations, number sentences, or expressions.
3. Apply the Order of Operations to simplify a numeric expression.
4. Place parentheses in an equality to make it correct, as in Problem #4 of practice HW #5P.
5. Recognize correct vs. incorrect use of = sign in examples; use it correctly in your OWN work.
6. Fix bad = sign usage with your choice of one new equality vs a list of separate, smaller equalities.
7. Explain what each of the Properties from Summary #2 means in words (3rd-5th grade style).
8. Given a 3rd-5th grade style description of a property, tell the name of the property described.
9. Given a number sentence, identify (closely spell) the FULL name of the property it illustrates.
10. Complete a number sentence to illustrate a required property and ONLY that property.
11. Simplify an algebraic expression by using the Distributive Property and combining like terms.
12. Given a verbal setting/description, write an algebraic expression that represents it. Declare meaningful variables if needed.
  - (a) Remember that variables should be declared as things that can be numbers: " $x$  = how many dimes" or " $x$  = number of dimes" is good, while " $x$  = dimes" is not.
13. Solve basic linear equations, clearly showing EACH step of work (same action on both sides).

**Number Sentence Terminology; Word Problem Scenarios:** Define the term *scenario*.

1. Name the four operations. Be able to switch between "related" operations in Fact Families.
2. Memorize and closely spell the terminology for all parts of number sentences.
3. Create number sentences having given numbers in specified roles; recognize when you cannot.
4. Create whole number sentences with more general behaviors or comparisons among their parts (such as "the addends have a product of 12"); explain impossibles.
5. Given a number sentence or just a list of numbers, write the associated Fact Family.
6. Know when division involving 0 is possible/not; use Fact Family relationships to explain.
7. Memorize names and features of all scenarios for each operation (see scenario summary handout).
8. Identify by name the scenario and/or operation represented in a given word problem.
9. Write the complete number sentence represented in a given word problem.
10. Make up an original word problem requiring a given computation and scenario.
11. When asked, distinguish "objects" vs. "measurements" in reading or writing a word problem.

**You will have the entire class period to take the exam. When you finish, you may hand it in and leave.**

**You may use a basic calculator (not cell phone, no alphabet), but no other aids are permitted.**

Students with documented accommodations should speak with me and process ODS requests ASAP.  
ODS should proctor your accommodations since our classroom and my schedule are not automatically free.