

PROBLEM-SOLVING TESTS

Preparing for Problem-Solving Tests:

1. Review notes and text -- list the major concepts and formulas that have been covered.
2. Highlight those topics/problems that were emphasized. Note why they were emphasized.
3. The best way to prepare for problem-solving tests is to solve problems -- lots of them. Work problems not previously assigned.
4. Analyze all problems you work:
 - What concepts, formulas, and rules did I apply?
 - What methods did I use?
 - How did I begin?
 - Have I seen this problem before?
 - Is it similar or dissimilar to other problems I've done?
 - How does my solution compare with the examples from the book and class?
 - Could this problem be worked another way? Can I simplify what I did?
5. In your own words, next to each problem-solving step, explain what you did and why.
6. Look for fundamental problem types. Usually a course has approximately 5 fundamental groups of problems -- make sure you can recognize what they are.
7. Try working problems out of sequence. For example, work a problem from Chapter 7, then one from Chapter 5, then one from Chapter 10, etc. This randomness will allow you to see how different problems relate to each other and will simulate taking tests.
8. Work with a time limit -- aim to solve as many problems as you will have on the test within the test time limit (i.e., 30 problems in 50 minutes).
9. Make up a practice test. You might cut/paste/Xerox a test from your homework problems.

Taking Problem-Solving Tests:

1. Before starting the test, turn it over and jot down all the formulas, relationships, definitions, etc., that you are trying to keep current in memory.
2. Look the whole test over, skimming the questions and developing a general plan for your work. If any thoughts come to you immediately as you look at a problem, note these in the margin.
3. Plan your time. Allow more time for high point value problems; reserve time at the end of the period to review your work and for emergencies.
4. Start with the easier problems, the ones for which you can specify a solution method quickly. This will reduce anxiety and facilitate clear thinking.
5. For the more difficult problems:
 - Make absolutely sure that you understand the posed problem; mark key words, identify the givens and unknowns in your own words, sketch a diagram or picture of the problem, anticipate the form and characteristics of the solution (e.g., it has to be an integer, the solution is an algebraic expression, etc.).
 - Make a note, in symbols, diagrams, graphs or tables, of all the information given.
 - For complex problems, list all the formulas you consider might be relevant to the solution; then decide which you will need to begin with.

6. If you still have no solution method:
 - If possible, write out an equation to express the relationships among all the givens and unknowns, accounting for all the data and facts of the problem.
 - Think back to similar practice problems to select a solution method.
 - Work backwards: Ask yourself, "What do I need to know in order to get the answer?"
 - Solve a simpler form of the problem if dealing with complex configurations OR substitute simple numbers for unknowns to reduce the amount of abstract thinking required.
 - Break the problem into a series of smaller problems and work each part, thus building up to a solution.
 - Guess an answer and check it. This process may suggest a solution method.
7. If all else fails, mark it to come back to later and work another problem. You may find clues in subsequent problems.
8. For all problems, easy and difficult:
 - Once you have the solution method, follow it carefully. Check each step for consistency in notation. Document all your work so that it may be read easily. Write legibly.
 - Evaluate your solutions. Check your answer against the original problem to make sure it fits.
9. Try all test problems. If your mind goes blank, relax for a moment and contemplate the problem OR mark it to come back to later.
10. If you run out of time and still have some problems left, try to gain at least partial credit by setting the problem up in a solution plan (even if you can't follow through on the calculations).

Analyzing Returned Problem-Solving Tests:

1. Read the comments and suggestions.
2. Locate the source of the test: did the problems come from the lectures, textbook, or homework?
3. Note any transformations -- how were the problems changed from those in the notes, text, and homework?
4. Determine the source of your errors.
 - Were your errors due to carelessness? For example, did you fail to carry a negative sign from one step to another?
 - Did you misread questions? For example, did you fail to account for all the given data in your solution method?
 - Did you consistently miss the same kind of problem?
 - Could you produce the formulas, or did you remember them incorrectly?
 - Were you unable to finish the test because you ran out of time?
 - Were you unable to solve problems because you had not practiced doing similar ones?
5. Did you have a difficult time during the test because you were too anxious to focus on the question?