

# Problem Solving Tests

## Preparing for Problem-Solving Tests

1. Review class notes and reading. List the major concepts and formulas from both.
2. Highlight those topics/problems that your instructor emphasized and note **why** they're important.
3. The single best way to prepare for problem-solving tests is to **solve problems**—lots of them. Be sure to work problems not previously assigned.
4. Analyze all problems you work by answering the following questions
  - 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, write what you did and why next to each problem-solving step.
6. Look for fundamental problem types. Typically a course has approximately 5 fundamental groups of problems; make sure you can recognize them.
7. Practice working problems out of sequence. For example, work a problem from Chapter 7, then one from Chapter 5, then one from Chapter 10. This randomness will allow you to see how different problems relate to each other and will simulate the test-taking experience.
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. Create a practice test. Consider cutting and pasting a test together 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 need to remember.
2. Review the whole test, skimming the questions and developing a general plan for your work. If any thoughts come to you immediately, write them in the margin.
3. Plan your time. Allow more time for high point value problems, and reserve time at the end for reviewing your work and fixing any emergencies.
4. Start with the easier problems, i.e. 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, follow these steps:
  - Be certain that you understand the 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.
  - Make a note—in symbols, diagrams, graphs or tables—of all the information given.
  - For complex problems, list all the formulas you consider relevant to the solution, then decide which you will need to get started.

(over)

## Problem Solving Tests

6. If you still have no solution method, try the following:
  - If possible, write out an equation to express the relationships among all the givens and unknowns, accounting for **all** the data and facts in the problem.
  - Think back to similar practice problems.
  - Work backwards. Ask yourself, "What do I need to get the answer?"
  - Solve a simpler form of the problem if dealing with complex configurations. Or substitute simple numbers for unknowns; try to reduce the amount of abstract thinking required.
  - Break a problem into a series of smaller problems, then work each part.
  - Guess an answer and then check it. The checking process may suggest a solution method.
7. If all else fails, mark the problem and return to it later. You may find clues in subsequent problems that will help you find a solution.
8. For all problems, both easy and difficult, don't forget the following tips:
  - Once you're established the solution method, follow it carefully. Check each step for consistency in notation. Document all your work thoroughly and neatly so it's legible.
  - 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 and return to it later.
10. If you run out of time and still have problems remaining, try to set the problem up in a solution plan so that you'll have a chance of receiving partial credit.

### 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, the textbook, or homework?
3. Note any alterations. How were the problems changed from those in the notes, text, and homework?
4. Determine the source of your errors. Asking yourself the following questions should be helpful.
  - Did your errors result from 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 recall them incorrectly?
  - Were you unable to finish the test because you ran out of time?
  - Were you unable to solve problems because you didn't practice similar ones?
  - Did you have difficulty on the test because you were too anxious to focus on the questions?