

Strategies to improve problem-solving skills

1. Use time and resources effectively

- Work on courses regularly: keep up so you can build on past knowledge (sequential learning), and get help quickly for difficulties.
- Do all the questions assigned, rather than dividing questions among group members, as you will get more practice with the concepts your Professor expects you to know. Aim for accuracy, then speed. Start assignments at least a week ahead of the due date, so you have time for help if needed.
- Use study groups to compare completed solutions to assigned problems. Teaching someone is a very effective learning and study technique.
- Choose problems wisely: learn to apply a specific concept to solve a variety of related problems. Start with simpler ones, and work up. Identify the relevant concept and practice until you know when and how to apply it, i.e. you may not need to do all questions.
- Set a time limit: attempt a new problem every @ 15-20 minutes. If you can't complete a problem, check your "thinking strategies" and change to a new problem. Get help with the problems you couldn't complete, at tutorial, etc.
- Do some uncalculated solutions: If you are confident in your calculations-set up the solution but don't finish the calculation.
- Learn the necessary background and skills: find out from professor, course outline, etc. what the course involves and upgrade before the course begins if you don't feel confident about the prerequisites.
- Find and use help resources: use tutors, professors, TAs, friends, text, internet. For example: in accounting, economics, and finance texts, it is common to find examples that are quite similar to the problems at the end of the chapter. Work through the logic of the examples to develop a better understanding of how best to start the homework problems, if you run into trouble.

2. Develop strategies to organize your thinking

Quantitative concept summary

Concepts are general organizing ideas, there are often very few of them taught in a course, along with their many applications (ie. the spiral of learning). Key concepts may be identified by:

- reading the learning objectives on the course outline or the course description,
- referring to the lecture outline to identify recurring themes,
- thinking about the common aspects of problems you are solving.

Learn and understand the small amount of information essential to each concept.

If in doubt, ask the professor what is important for you to “get”.

Tools: [Quantitative Concept Summary Strategy](#), [Concept Summary form](#), [an example of a Concept Summary for Ordinary Simple Annuities](#).

View [a video about Concept Summaries](#) at McMaster University. Click on Online Resources, scroll to “Math,” then select desired topic and format.

General problem-solving method

Use a methodical, thorough approach to solve problems logically from first principles. Refer to the [self-assessment questionnaire](#) by Woods et al. (2000) in this guide to remind yourself of target activities you need to focus on.

Steps:

- Engage with the problem
- Define and understand the problem- what is being asked? Express your thinking in several ways, such as verbally, graphically or pictorially, and finally mathematically
- Explore links between the current problem and related ones you have previously solved.
- Plan how you will solve the problem
- Do it ✓
- Evaluate your method and result, and revise as needed

Tool: [General Problem Solving Strategy](#).

Decision steps strategy

This strategy is a specific application of the General Problem Solving Strategy described above, and is suitable for use in statistics, accounting and other applied problem solving situations.

During the lecture or when reading course notes, focus on the process of solving the problem, instead of on the computation. When your professor is lecturing, listen to their comments on how steps are linked from one to another. This helps you identify the “decision steps” that lead to correct application of a concept. Ask yourself “Why did I move from this step to this step?”

Tools: [Decisions Steps Strategy](#), and examples of [Decision Steps in Calculus](#) and [Decision Steps for Rational Expressions](#).

View [McMaster University’s video](#): click Online Resources, scroll to “Math”, select topic and format.

Problem-solving homework strategy

Use homework as a learning tool. Effective learning of the concepts and general methods will reduce the number of problems you may need to solve to feel confident in your knowledge and computations.

Tool: [Problem Solving Homework Strategy](#).

Range of problems strategy

Exams will challenge you to apply your knowledge to new situations, so prepare by creating questions or problems that are slightly different in some variable from your homework problems.

Actively think about the range of problems that are associated with a concept. Think in terms of both

- i. level of difficulty of the problems
- ii. common kinds of difficult problems.

Use this to anticipate different kinds of difficult problems for exam preparation, and solve some practice problems to test yourself. This is an excellent activity for a study group.

Tool: [Range of Problems Strategy](#).

View [McMaster University's video](#): click Online Resources, scroll to "Math", select topic and format.