

## Problem-Solving

Solving applications (or “word problems”) can be a challenge, but it is the whole reason that we study math—to be able to apply mathematical processes to find solutions to questions we face.

A well-respected process for solving problems is credited to George Polya (*How to Solve It*, 1945) and involves four principles. (The process is sometimes described with five or six steps.)

Those principles are:

- Understand the problem. Read it several times until you know what you need to find. Make note of information the problem gives you.
- Make a plan. Use one or more of the strategies listed below.
- Carry out the plan. If you are stuck, try another strategy.
- Look back. Make a final check to be sure the answer is reasonable and satisfies the requirements stated in the problem.

### Strategies

Depending on the type of problem, there are many strategies that can help you find a solution.

- Draw a sketch of the situation.
- Look for a pattern.
- Find a known relationship between quantities—a formula.
- Solve a simpler problem and work your way toward the harder problem.
- Make a list of possibilities, and eliminate those that do not work.
- Use the “guess and check” method to get closer and closer to the correct solution.
  
- Research. This strategy isn’t an option if you are taking a test and cannot look up how others have solved the problem, but in everyday life, we rely on solutions that have already been found. By following the steps taken by others, we can teach ourselves problem-solving techniques.

### Grit

Solving complicated problems often takes time and persistence. The ability to continue trying different methods when the first attempt doesn’t work, is a skill you will need in life, as well as in mathematics. This characteristic is known as “grit,” and you can increase your grit by choosing to try again when your first problem-solving attempt fails.

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