

Math&142 Trigonometry

Preface

To be successful in calculus, students need several things: a background in elementary/intermediate/college algebra/trigonometry. Content background is important. Other things are also required: a basic ability to read and understand mathematics as a language as well as a science; an ability to think actively and critically; and an ability to break apart and understand application problems.

The process used by Computational Class Notes (CCN) provides appropriate background, more than sufficient exercises and applications for students to approach the rigors of calculus very well-prepared.

George Polya developed a well designed method of approaching application problems.

Polya's First Principle: Understand the problem

This seems so obvious that it is often not even mentioned, yet students are often stymied in their efforts to solve problems simply because they don't understand it fully, or even in part. Polya taught teachers to ask students questions such as:

- Do you understand all the words used in stating the problem?
- What are you asked to find or show?
- Can you restate the problem in your own words?
- Can you think of a picture or diagram that might help you understand the problem?
- Is there enough information to enable you to find a solution?

In order to do this step successfully, you need to read the problem through at least twice. The first time, read it without a pencil in your hand. If the problem is still unclear, read it yet again. Only now might you pick up your pencil to begin writing things.

Polya's Second Principle: Devise a plan

Polya mentions that there are many reasonable ways to solve problems. The skill at choosing an appropriate strategy is best learned by solving many problems. You will find choosing a strategy increasingly easy. A partial list of strategies is included:

- Guess and check
- Make an orderly list
- Eliminate possibilities
- Use symmetry
- Consider special cases
- Use direct reasoning
- Solve an equation
- Look for a pattern
- Draw a picture
- Solve a simpler problem • Use a model
- Work backwards
- Use a formula
- Be ingenious

Polya's Third Principle: Carry out the plan

This step is usually easier than devising the plan. In general, all you need is care and patience, given that you have the necessary skills. Persist with the plan that you have chosen. If it continues not to work discard it and choose another. Don't be misled, this is how mathematics is done, even by professionals.

Do not believe that you are inept. All mathematicians are inept.

Polya's Fourth Principle: Look back and check your solution!

Much can be gained by taking the time to reflect and look back at what you have done, what worked, and what didn't. Doing this will enable you to predict what strategy to use to solve future problems.

Some additional thoughts regarding learning mathematics

Maintain a positive attitude.

Communicate with your instructor, regularly.

Ask questions. No question is a stupid question.

Never cry over mathematics...or any other subject!

Do some homework every day!

Work with other students. This will expand your understanding of different approaches to mathematics.

Visit the Math Study Center. These students are your contemporaries and, just as your instructors, want you to succeed.

Be aware that understanding mathematics is achievable for virtually every student.