

## Math Review for high school graduates planning to enroll in college STEM courses

The goal of these notes is to help you manage the leap from high school math to college math. In high school, much of the curriculum is devoted to setting up and solving simple real-life problems, but formal algebra instruction is not heavily emphasized.

College is different. Virtually every topic in the STEM curriculum requires mastery of algebra and formulas, which are the key to representing and solving problems in Science, Technology, Engineering, and (of course) Mathematics.

Mathematics is a tool for solving real-life problems, but it is much more. In ancient Greece, it became apparent that the clarity of mind honed by the study of mathematics for its own sake is of fundamental value to society in other ways as well.

Indeed, in Plato's *Republic*, a blueprint for the ideal state, future leaders were required to study mathematics for ten years before going on to more practical affairs of ethics and government. In Book VII, Socrates explains:

*In every man there is an eye of the soul which, when by other pursuits lost and dimmed, is by the study of mathematics, purified and re-illuminated.*

*This eye is far more precious than ten thousand bodily eyes, for by it alone can truth be seen.*

These words, written more than two thousand years ago, remain true today. Here is a recent rephrasing by Isaac Asimov, from his foreword to *The History of Mathematics*, by Brooklyn College Professor Carl Boyer:




*Mathematics is a unique aspect of human thought... Nothing pertaining to humanity becomes us so well as mathematics. There, and only there, do we touch the human mind at its peak.*



You will need to work hard to get to the point where you can really appreciate the beauty and power of the math that you are learning.

To help you reach that goal, this text is written to have a conversation with you. An important innovation is that many procedures are explained, and graphs are drawn, according to your instructions, step by step, so that you can proceed at a comfortable pace.

Enjoy mathematics!



### How to access and read this text

- In your browser, go to <http://ccnymath.net>
- Start by clicking on Chapter 1: Algebra and Plane Geometry. Then click on the "Fit to Page" control at the top of the screen.
- Make sure that the screen replaces the current page by the following page when you press the Page Down or Right Arrow keys on your keyboard. Similarly, press Page Up or Left Arrow to scroll to the previous page. These keys will also move you forward or backward on a page that contains multiple subpages (frames).
- To explore the chapter, mouse-click on
  - blue navigation buttons ;
  - chapter titles at the top of any slide;
  - Adobe controls at the bottom right of any slide. The most important of these is , which takes you to the slide that you previously viewed.
- Click  buttons to explore the entire document. Then read the next column for details on how to study.

- Begin with Chapter 1, which consists of Sections 1.0 through 1.9. Start by clicking  Section 1.0 to list its subsections. Move to the next page for a Preview of its Definitions, Theorems, and Procedures. Clicking any  button takes you to the text's complete discussion, which appears as



To return to the Preview, click the Adobe control .

- Read Section 1.0 carefully.
- Quiz 1.0 that follows is a good homework assignment. It lists the Examples worked out in Section 1.0. Work them out by yourself. If necessary, click the  button preceding a Quiz Example to see its solution. Then click  to get back to the Quiz.
- The Review 1.0 section, following the Quiz, helps you prepare for exams. Each set of 4 questions in the Review includes a Quiz Example as well as 3 similar examples that you should solve to see if you really know that material. Solve each set before you check the answers provided. When you are done, go back to the Preview to see if you really know the material.