

## Note to the instructor:

This paper and accompanying PP may be used independently or together to support learning about the Report of Committee on College Entrance Requirements. The PP is designed to inform and stimulate discussion. The paper has some additional information that supplements the information provided in the PP.

All of this information was captured from the original report. The original report consists of 188 pages and was published by the University of Chicago Press. It is long since out of print and unavailable at many institutions. Therefore we decided to scan several sections to make copies of some of the "original pieces" available. Only pages related to mathematics were scanned, and this material can be accessed at this URL.

More specifically, the scanned version provides the following material:

- pp. 1-4 Title page, preface and Table of Content
- pp. 5-12 Background for the formation of the committee
- pp. 20-23 Summary of the Mathematics report
- pp. 135-149 Mathematics report from the Chicago Section of the AMS

This effort to provide resources to faculty conducting courses in mathematics curriculum is a work in progress. The CSMC invites your suggestions for improving this instructional resource.

### Additional suggested reading:

Osborne, A. R. & Crosswhite, F. J., (1970). Forces and issues related to curriculum and instruction, 7-12, In Phillip Jones Ed., A history of mathematics education in the United States and Canada, (pp. 168-173) Reston, VA: National Council of Teachers of Mathematics.

National Education Association (1899). Report of Committee on College Entrance Requirements, Chicago: University of Chicago Press

## The Committee on College Entrance Requirements

### Why?

In the 1800s, a wide range of courses in secondary school existed and the varied backgrounds of high school graduates made it difficult for them to be evaluated for admission to college. As more high schools developed and more students began to attend high schools, this problem of accommodation was becoming more acute. At the annual meeting of the Department of Secondary Education of the National Educational Association in 1896 a resolution “The most pressing need for higher education in this country is a better understanding between the secondary schools and the colleges and universities in regard to requirements for admission.” was unanimously adopted.

### What?

In response to this situation, the National Education Association appointed a committee that represented both higher and secondary education to “study the question of college-entrance requirements.” In 1896 the Committee was formed and its report was issued in 1899 in the form of a publication entitled Report of the Committee College Entrance Requirements.

### Who?

#### Members of the Overall Committee

##### From Secondary Education

A. F. Nightingale, Superintendent of Chicago High Schools, Chair  
William Smiley, Principal of Denver High School  
George Aiton, Minnesota State Inspector of High Schools  
J. Remsen Bishop, Principal of Walnut Hills High School, Cincinnati  
John Buchanan, Principal of Boys’ High School, Brooklyn  
Ray Huling, Principal of English High School, Cambridge

##### From Higher Education

Henry Fine, Princeton University  
Paul Hanus, Harvard University  
Burke Hinsdale, University of Michigan  
Edmund James, University of Chicago  
William Jones, University of California, Berkeley  
James Russell, Columbia University  
Charles Thurber, University of Chicago

Much of the mathematics portion of the report was the result of work by the Committee of the Chicago Section of the American Mathematical Society.

##### Members of the AMS Committee:

J. W. A. Young, University of Chicago, Chairman  
J. J. Schobinger, Principal of Harvard School, Chicago  
Ellery Davis, Mathematics Department, University of Nebraska

Thomas Holgate, Applied Mathematics, Northwestern University  
L. S. Hulbert, Mathematics Department, John Hopkins University  
C. W. Lyon, Principal of Grammer School, Brooklyn  
H. B. Newson, Mathematics Department, Kansas State University  
W. F. Osgood, Mathematics Department, Harvard University  
James Shaw, Mathematics Department, Michigan Military Academy  
B. M. Walker, Mathematics Department, Mississippi A & M College

### **What was produced?**

The publication was divided into two parts. The first part provided background information on the process used in preparing their report and included summaries from the subject matter disciplines. It also included some general recommendations, including a resolution to “increase the school day in secondary schools to permit a larger amount of study in school.” This reflected the current practice of schools having about 5 hours per day, and some high schools had two five hour sessions to accommodate more students.

Otherwise, the general report made recommendations that were “in agreement with those of the mathematical conference of the Committee of Ten and . . . the Chicago Section of the American Mathematical Society.”

#### Specific mathematics course offerings recommendations:

1. Arithmetic course be required of all students and be limited to the “four fundamental operations for integers, and common and decimal fractions.”
2. Recommended at least 45 minute periods for mathematics study in these grades:

7 <sup>th</sup> grade—concrete geometry & introductory algebra	4 periods a week
8 <sup>th</sup> grade—demonstrative geometry and algebra	4 periods a week
9 <sup>th</sup> & 10 <sup>th</sup> grades—algebra and plane geometry	4 periods a week
11 <sup>th</sup> grade—solid geometry and trigonometry	4 periods a week
12 <sup>th</sup> grade—advanced algebra and mathematical reviews	4 periods a week
3. Elementary algebra was to include equations of the first degree with numerical coefficients, solution of equations with one and two unknowns, radicals and fractional exponents, quadratic equations in one and two unknowns, binominal theorem for positive integral exponents and use of logarithms.
4. Advanced algebra was defined as topics found “in an ordinary text-book of college algebra viz. The elementary treatment of infinite series, undetermined coefficients, the binominal theorem for fractional and negative exponents, the theory of logarithms, determinants, and the elements of the theory of equations.”
5. Recommended the following mathematics course credits be counted toward college admission:

Elementary algebra	1.5 units
Advanced algebra	1 unit

Plane geometry	1 unit
Solid geometry	0.5 units
Plane trigonometry	0.5 units

6. Recommended that the scholarship for these courses be at the same level as “the best American colleges require in their courses for these subjects.”
7. Recommended that mathematics be taken every year, including their last year of high school or that a mathematical review be provided in preparation for college.

It is worth noting that the Committee’s general report indicated strong support for many suggestions “relative to the teaching of mathematics” but these recommendations were not specifically included.

The AMS report provided the following summary of their most important conclusions:

- “1. To the close of secondary-school course the required work in mathematics should be the same for all pupils.
2. The formal instruction in arithmetic as such should terminate with the close of the seventh grade.
3. Concrete geometry should be a part of the work in arithmetic and drawing in the first six grades.
4. One-half of the time allotted to mathematics in the seventh grade should be given to the beginning of demonstrative geometry.
5. In the eighth grade the time allotted to mathematics should be divided equally between demonstrative geometry and the beginning of algebra.
6. In the secondary school, work in mathematics should be required of all pupils throughout each of the four years of the course.
7. Wherever, from local conditions, it is necessary to defer the beginning of geometry and algebra to the secondary school, here, likewise geometry should be begun before algebra.
8. When once begun, the subjects of geometry and algebra should be developed simultaneously, in so far, at least, that both geometry and algebra should be studied in each of the four years of the secondary-school course.
9. The unity of the work in mathematics is emphasized, and the correlation and interapplication of its different parts recommended.
10. The instruction should have as its chief aim the cultivation of independent and correct thinking on the part of the pupil.
11. The importance of thorough preparation for teachers, both in mathematical attainment and in the art of teaching, is emphasized.”(p. 148)

In addition to discussing mathematics content, the AMS report addressed a number of issues related to pedagogy. Among them are the following:

### Methodology

1. The good teacher should use multiple methods.

2. The aim of teaching should be to “cultivate independent thinking” by the student.
3. The value of learning mathematics is not by what is memorized but what the student thinks and produces. “Not learning proofs, but proving” should be the major goal in the study of mathematics.
4. Developing independent thinkers should dominate “instruction from the very beginning.”

### Teacher Preparation

The report makes a strong case for supporting new mathematics teachers in this commentary:

“At present young teachers of no experience, having no pedagogic preparation, are often put into full charge of classes, and receive no assistance, no advice, no encouragement from more experienced colleagues. They have as a model only some recollections of their impressions (as pupils) of the teaching which they received. They profit as best they can by their own experience, and learn from their own mistakes. Some never appreciate their shortcomings or how to remedy them; even for the best it is a devious and painful path to excellence, which might be shortened and eased by the judicious counsel of one who has traversed the path himself.” (p. 147)

More specifically the following suggestions were offered:

1. Minimum content in mathematics should include “analytic geometry, a first course in calculus and the elements of the theory of equations.”
2. The first year or two of teaching should be “under the careful supervision of an experienced teacher of mathematics.”
3. Relationship between new and experienced teachers should involve mutual classroom visits together with friendly and careful advice.
4. In schools with several mathematics teachers they should meet regularly to study some mathematics and also discuss pedagogy of (i.e., how to teach) specific mathematical topics.
5. Mathematics teacher should learn new mathematical content every year.

### **Significance of the Committee on College Entrance Requirements**

- Many high schools lengthened their day from 5 to 6 or more hours.
- The Committee’s definition of a unit of credit “45 minutes” for 4 or 5 periods was adopted by the Commission on Accredited Schools of the North Central Association.

- Their characterization of mathematics content in specific courses influenced the scope and sequence of the topics in high school mathematics courses.
- Their recommended order of mathematics courses had great influence on high schools throughout the United States.
- The Committee's work led to the establishment of the College Entrance Examination Board in 1900.