2- Name each number as tens and ones in two ways.
   a) 27 (2 tens and 7 ones, 1 ten and 17 ones)
   b) 109 (10 tens and 9 ones, 9 tens and 19 ones)

3- Complete the following sentences.
   a) 286 = 2 hundreds + ____ tens + 6 ones
   b) 286 = 2 hundreds + 5 tens + _____ones
   c) 286 = 1 hundred + ____ tens + 6 ones

4- Name each of the following in three different ways using hundreds, tens and ones.
   a) 405
   b) 312, etc.

5- Name the following using thousands, hundreds, tens, and ones.
   a) 9,125
   b) 3,047, etc.

In addition to the ideas presented above on the use of the number line and on number-numeral distinctions, operations and their opposites, the properties of operations can also be used to blend some contemporary mathematics into the traditional approach.

CURRICULAR DEVELOPMENTS IN MATHEMATICS EDUCATION, by J. S. Hrabi

Editor's Note: Mr. Hrabi has had wide experience in matters of curriculum. Because of his close connection with the Mathematics Council since its formation, his remarks at the 1963 Annual Conference were particularly apt and timely. Following is his summary of curricular developments in Canada and Alberta.

Now let us turn our attention to the Canadian scene. At the elementary level new authorizations have been made within the last three years in British Columbia, Alberta, English-Catholic Quebec, and the Northwest Territories. The Scott-Foresman series, Seeing Through Arithmetic, has been authorized in each of these areas. In Alberta,

the Ginn and Company Arithmetic We Need program was also authorized and is being used in approximately five to ten percent of the schools. At the junior high school level professors Crawford and Rosenburg have developed a Grade VII, VIII and IX series in New Brunswick. This series is still experimental but I understand it is soon to be published. The content which is quite conventional, is characterized by an introduction in Grades VII, VIII and IX of material previously included in higher grades. As mentioned, the Ontario Mathematics Commission prepared an experimental program at the Grade IX level. This program, which has been published by W. J. Gage and Company, bears the title Mathematics 9. The authors are Coleman, De Grande, Mulligan and Totton. This book is now on the recommended list for use in Ontario schools as of September 1963. My understanding is that the book is not being widely used. Also on the recognized list is Mathematics by MacLean, et al, published by Copp Clark Co. This book is a modernized version of an existing text. In Saskatchewan, Modern Algebra, Book 1, by Dolciani, Berman and Freilich, published by Houghton and Mufflin has been authorized at the Grade IX level effective September 1964. This book represents a reasonable marriage of conventional and traditional mathematics. In British Columbia the text Introduction to Mathematics by Brumfiel, Eicholz and Shanks, published by Addison and Wesley (the first text of the Ball State Experimental Mathematics Project) was authorized for use in Grade VIII in September 1962. The text Modern Elementary Algebra by Nichols and Collins, published by Holt, Rinehart and Winston, is authorized for use in Grade IX, in British Columbia, effective September 1963. Both of these texts are quite modern in flavor. In Alberta, the Junior High School Mathematics Subcommittee is experimenting with three series of textbooks at the Grade VII level and two series at the Grade VIII level. It is anticipated that a new authorization will be made possibly in September 1964, but more probably in September 1965.

At the senior high school level no new authorizations have been made in any province to my knowledge. In Alberta, the Mathematics 10 course was modified somewhat by using the authorized text and several references. The vocational mathematics sequence, Mathematics 12, 22 and 32 is in the process of revision as is the commercial sequence Mathematics 11 and 21. In addition, the cities of Edmonton and

Calgary have developed a Mathematics 14 program which is either a preparation for or a part of the Mathematics 10 program. This course is considered to be the first course of a four-year matriculation mathematics sequence. It is anticipated that this course will be available on a provincial basis effective September 1964. My personal view of the entire problem can be summed up as follows. I am very pleased with the situation at the elementary school level. Available research indicates that the programs authorized do result in increased growth in mathematical skills. I am satisfied with the teacher reaction to the new courses, and am happy to see that the Mathematics Council of The Alberta Teachers' Association has been an effective agency in the inservice training of teachers through the seminar conducted in Edmonton during the summer of 1962. I trust that seminars of this nature will continue.

I am also in accord with the trends evident in experimental programs at the junior high school level. I feel we can and should reduce the emphasis on percentage application and increase the mathematical content substantially. Available evidence indicates that the majority of students can learn and enjoy learning the content suggested. Caution is necessary at this level, however, since in Alberta, we are committed to a single program in the junior high school (at least on a provincial basis).

As far as the type of geometry course suitable for the senior high school, I tend to favor a course which begins in a conventional manner, uses synthetic proof and which very early in the course introduces coordinate geometry. This approach gives students an appreciation of the flavor of Euclidean geometry and enables students to use algebraic methods in proving geometric relationships. In my opinion, the algebraic methods are simpler than the geometric methods.

I think, too, that trigonometry may disappear as a separate course and essential trigonometric notions can be integrated into an algebra course. However, caution is advised in developing such a program because many authors, in preparing their texts, treat trigonometry very lightly. Though I feel there is a need for change in mathematics curricula, I maintain that caution is advisable in the introduction of all new mathematics programs. Content should be tested in Alberta

before an authorization to teach the new courses is made and teachers and supervisors must be prepared through inservice training procedures.

I believe that Mathematics 30, prerequisite for university entrance to many faculties, is unrealistic and screens some potentially capable students out of the social sciences. If this prerequisite is maintained, I would favor a Grade XII program of the following nature: (1) A very strong mathematics course which would include an intuitive preparation for calculus. This course could be required of students who wish to major in mathematics, physics, or engineering, and of prospective teachers of mathematics. (2) A second course which would tend to emphasize the importance of mathematics as discipline and how it can contribute to progress in the social sciences. Possible topics in such a course would include probability, statistical inference and linear programming. This course could be required of students who wish to go into the social sciences or into education and would likely be elected by those going into mathematics, physics, and engineering.

Because of curriculum ferment, these are interesting and challenging times for mathematics teachers. I trust you will examine developments in mathematics curriculum with a critical but open-minded attitude and not become over enthusiastic about ideas only because they are new, for I believe this path leads to chaos. I hope, also, that you will not reject ideas only because they are not in accordance with tradition because I believe that this path leads to stagnation. I do hope you will examine as many new curricula as your busy schedule permits and if you find some approaches that seem useful you will try them. This is the path to professional maturity!