THE ALBERTA TEACHERS' ASSOCIATION

MATHEMATICS COUNCIL

NEWSLETTER

Volume VII, Number 1, December, 1967

Contents

PROFESSIONAL DATES

December 6, 1967	Edmonton Elementary Mathematics Study Group at Victoria Composite High School
December 8-9, 1967	Canadian Association of Mathematics Teachers - meeting on Mathematics Curricula in Canadian Schools, Ottawa
December, 1967	NCTM Joint Meeting with Association for the Advancement of Science, New York
April 17-20, 1968	46th Annual Meeting of NCTM Philadelphia, Pennsylvania

Newsletter Editor: Mary Beaton
Faculty of Education, University of Calgary

TRIGONOMETRIC FUNCTIONS OF SUMS

William J. Bruce

Dr. Bruce is an associate professor in the Department of Mathematics at the University of Alberta.

The following analytic method of launching a study of trigonometric functions of sums involves the unit circle, the distance formula and a simple rotation; it also furnishes quite briefly a completely general result in a rather elegant manner.

Consider any two angles α and β in standard position with P_1 and P_2, respectively, points on their terminal sides on a unit circle. The coordinates of P_1 are thus $(\cos \alpha, \sin \alpha)$ and those of P_2 are $(\cos \beta, \sin \beta)$ - see Figure 1. By the distance formula, $d^2 = |P_1P_2|^2$ is given by

$$d^2 = (\cos \alpha - \cos \beta)^2 + (\sin \alpha - \sin \beta)^2$$

$$= \cos^2 \alpha + \cos^2 \beta - 2 \cos \alpha \cos \beta + \sin^2 \alpha + \sin^2 \beta - 2 \sin \alpha \sin \beta$$

$$= 2 - 2(\cos \alpha \cos \beta + \sin \alpha \sin \beta)$$

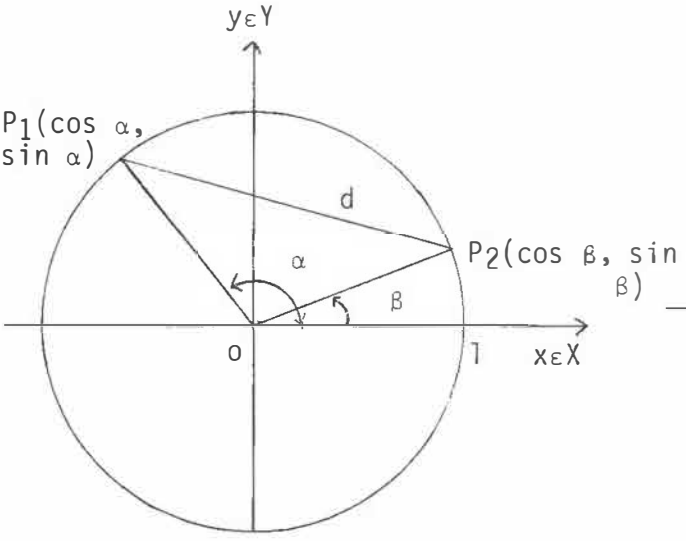

Fig. 1

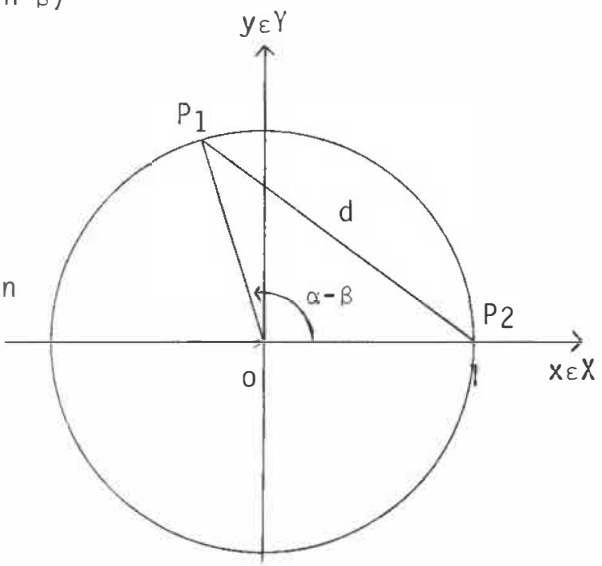

Fig. 2

Rotate P_1P_2 about O, through the angle $-\beta$, so that $P_1(\cos \alpha, \sin \alpha)$ becomes $P_1[\cos(\alpha-\beta), \sin(\alpha-\beta)]$ and $P_2(\cos \beta, \sin \beta)$ becomes $P_2[\cos(\beta-\beta), \sin(\beta-\beta)]$ or $P_2(1,0)$ - see Figure 2. By the distance formula we now obtain

$$d^2 = [\cos(\alpha-\beta) - 1]^2 + \sin^2(\alpha-\beta)$$

$$= \cos^2(\alpha-\beta) - 2\cos(\alpha-\beta) + 1 + \sin^2(\alpha-\beta)$$

$$= 2 - 2\cos(\alpha-\beta)$$

Since rotation does not change d, we have

$$2 - 2\cos(\alpha-\beta) = 2 - 2(\cos\alpha\cos\beta + \sin\alpha\sin\beta)$$

which upon simplification yields

$$\cos(\alpha - \beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$$

Furthermore, since the preceding arguments are the same for all values of α and β, the above result is true in general.

TEACHER'S GLOSSARY OF NEW MATHEMATICAL TERMS
(From the *Bulletin of the California Mathematics Council*)

SET: What you do in a chair.
SUBSET: What you do under a chair.
PROPER SUBSET: Sitting straight under a chair.
EMPTY SUBSET: Somebody is absent.
CLOSED SET: Kindergarten teachers.
ELEMENT: Large animal with a trunk.
CLOSURE: Last day of school.
SYMBOL: Part of a brass band.
BINARY: Two-headed canary.
RATIONAL NUMBER: Four-day week.
UNIVERSE: Poems you know.
IRRATIONAL NUMBER: Parent with a complaint.
FRACTION: Broken bones.
PLANE: Not fancy.

"WHAT, GEOMETRY FOR THE ELEMENTARY SCHOOL?"

Mrs. D. Bowering

Mrs. Bowering is studying mathematics education in the Faculty of Education at the University of Calgary. Her report of the Red Deer Conference indicates that the program included items of great interest to the elementary teacher.

At the recent Mathematics Conference held in Red Deer, Dr. Robert Jackson of the University of Minnesota presented to the Division One Section a strong case of the inclusion of geometry in the revised program of the new mathematics curriculum from kindergarten through Grade VI. He suggested that the children could learn to use geometric figures and their names, and be introduced to non-metric geometrical concepts at an early age. By this means a child would be more capable of analyzing the physical world about him, acquire basic vocabulary and fundamentals for future study, and develop a genuine interest in mathematics.

Eunice Canning, consultant for Scott, Foresman and Co., and Dr. H. Elliott, who had experimented with the teaching of geometric concepts in Ontario kindergartens, concurred. Miss Canning felt that geometry provided a program of action, flexibility and creativity for the imaginative six, seven and eight-year olds. She stated that the primary job in a primary school was to relate mathematical concepts to the child's own world. Geometry provides a rich source of mathematical concepts which could be related to the real world.

Slow learners can learn mature mathematical concepts but at a different pace and sequence. They, too, deserve an enriched program even more than the capable student. The demonstrations provided by each speaker would stimulate thinking of all types of students.

Dr. Elliott's laboratory approach to "Space and Shape" mathematics (geometry) was intriguing. With straws, pipe cleaners and paper he constructed intricate geometric models that would prove educational and motivating to all students.

Geometry will draw the soul toward truth
and create the spirit of philosophy.

Plato

His first "lesson" in geometry - a puzzling and fascinating new field to explore.

CURRENT PROJECTS

The Ideal Mathematics Classroom

A Project for All Members of MCATA

The Mathematics Council has undertaken, as a project, the investigation of the ideal mathematics classroom. As now seen, the project involves two phases: (1) the examination of any available literature as to what the ideal mathematics classroom should be like, both with regard to the physical facilities as well as the equipment and materials that should be available in it; and (2) the publication of a list of recommendations based on the findings. This is to be made available to school boards, administrators, and school architects, as well as to others concerned with providing mathematics teachers the best possible opportunity to do their jobs.

Help is needed in each of the following areas:

- suggestions as to where to find the information;
- interested teachers who would be willing to study some of the material and prepare recommendations.

Anyone who is willing to assist with this project in any way is invited to contact the chairman of the MCATA committee:

Murray R. Falk,
Ste. 201, 4004-19th St. NW,
Calgary, Alberta.

The Edmonton Elementary Mathematics Study Group

On September 27, the Edmonton Elementary Mathematics Study Group held its first meeting of this term. The meeting was a tremendous success with about seventy teachers present. A film, "Development of Our Decimal Numeration System", was shown. This film is one of the NCTM series called "Mathematics for Elementary School Teachers". Following the film a workshop was held in which teachers had a great time sawing, drilling and molding to make for themselves some of the manipulative devices demonstrated in the film.

The general purpose of this group is to improve the teaching of mathematics at the elementary level and to keep teachers informed of new developments in elementary mathematics.

A considerable amount of effort has been put into organizing a program for the 1967-68 year, but to make it successful we need the assistance of all interested people in publicizing it.

EXECUTIVE COMMITTEE, MCATA, 1967-68

President	**A.W. Bruns**, Box 850, Lacombe	Res. 782-3180 Bus. 782-6272
Vice-President	**M.R. Falk**, Wilfred Laurier Jr. H.S. Calgary	Res. 289-2276 Bus. 272-2949
Past President	**M.P. Bye**, 3836 Vancouver Cres. NW Calgary	Res. 282-2745 Bus. 263-8130
Secretary	**Mrs. A. Oberg**, 10010-107 A Avenue, (EPSB), Edmonton	Res. 488-9306 Bus. 429-5621
Treasurer	**Mrs. M. Herchek**, 8418-76 Street, Edmonton	Res. 466-7395
Chairman of Editorial Board	**T. Rempel**, 11620-44 A Avenue, Edmonton	Res. 433-9674 Bus. 434-9406
Faculty of Education Representative	**R. Cleveland**, University of Calgary, Calgary	Bus. 282-0110
Department of Mathematics Representative	**R. Guy**, University of Calgary, Calgary	Res. 289-9613 Bus. 282-0448
Senior High Representative	**Edwin Olsen**, Box 22, Eckville	Res. 746-2331
Elementary Representative	**H. Riggs**, EPSB, Edmonton	Res. 469-4197 Bus. 429-5621
Junior High Representative	**Mrs. Bernice Anderson**, 12 Hilton Ave., Calgary	Res. 289-8215 Bus. 288-7141
Department of Education Representative	**J.S. Hrabi**, 10916-54 Avenue, Edmonton	Res. 229-3340
Member at Large	**L.J. MacKenzie**, Box 580, Hanna	Res. 854-3644 Bus. 854-3811
ATA Representative	**T.F. Rieger**, Barnett House, Edmonton	Res. 434-7597 Bus. 455-3181