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EDUCATION

This department publishes articles, notices, and news on programs and courses in history of mathematics, the uses of history in mathematics education, historical activities at meetings of mathematics teachers, and other matters relating to the place of our discipline in academic affairs.

A HISTORY OF MATHEMATICS COURSE FOR TEACHERS

By M. A. Malik
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The Department of Mathematics at Concordia University in Montreal offers an academic programme leading to an MTM (Master

in the Teaching of Mathematics) degree for teachers in mathematics. The main goals of the programme are to improve the mathematics background of the students and to acquaint them with problems related to the teaching of mathematics. With these goals in mind, I selected as the subjects of my lectures some topics in geometry, algebra, calculus, and analysis related to the pre-university mathematics:

1. General discussion of what mathematics is and its role in other disciplines. "New math" and pedagogical problems.

2. Egyptian and Babylonian mathematics. The Pythagoreans; the concept of proof; the golden section and commensurability.

3. Euclid's elements. The parallel postulate and the work of Al-Nirizi and Nasir Eddin al-Tusi.

4. Saccheri and the parallel postulate. Non-Euclidean geometry and its influence on mathematics and other disciplines. The axiomatic approach.

5. Algebra of Al-Khowarizmi. Geometrical (Omar Khayyam) and algebraic (Cardan-Tartaglia) solutions of cubic and quartic equations.

6. Bombelli and complex numbers. Non-commutative-multiplication of quaternions. The Fundamental Theorem of Algebra. Polynomial equations of degree 5 and higher.

7. Zeno's paradoxes. Galileo vs Aristotle; the mathematization of motion. Analytic geometry and Descartes; curves described by motion.

8. Archimedes and volume. The invention of the calculus.

9. The Bernoulli family. Taylor's series. Euler's zeta function, $\zeta(s)$.

10. Berkeley's criticisms of Newton's fluxions and subsequent developments. Bolzano and Cauchy. Definition of limit.

11. Beginning of modern analysis. Fourier and the heat equation. The concept of a function; Euler and Dirichlet. The nowhere-differentiable function of Weierstrass.

12. Integration: Cauchy, Riemann, and Lebesgue.

13. Real numbers: the contributions of Dedekind and Cantor; Peano's axioms.

In preparing the lectures, I used the histories of Boyer, Grattan-Guinness, Hawkins, Kline, and Kramer; the standard translations of Euclid, Archimedes, Al-Khowarizmi, and Descartes; several mathematical texts; and publications on mathematical education.