## TABLE OF CONTENTS

Preface	1
1. PREPARING MATHEMATICS FOR STUDENTS	
Introduction Bernard Winkelmann	9
Eclectic approaches to elementarization: Cases of curriculum construction in the United States  James T. Fey	15
Didactical engineering as a framework for the conception of teaching products  Michèle Artigue	27
Mathematical curricula and the underlying goals  *Uwe-Peter Tietze*	41
2. TEACHER EDUCATION AND RESEARCH ON TEACHING	
Introduction Rolf Biehler	55
Reflections on mathematical concepts as starting points for didactical thinking  Hans-Joachim Vollrath	61
Beyond subject matter: A psychological topology of teachers' professional knowledge Rainer Bromme	73
Dialogue between theory and practice in mathematics education Heinz Steinbring	89
On the application of science to teaching and teacher education <i>Thomas J. Cooney</i>	103
3. INTERACTION IN THE CLASSROOM	
Introduction Rudolf Sträßer	117
Theoretical and empirical approaches to classroom interaction Maria G. Bartolini Bussi	121
Theoretical perspectives on interaction in the mathematics classroom Heinrich Bauersfeld	133

Working in small groups: A learning situation?  Colette Laborde					
Mathematics classroom language: Form, function and force David Pimm	159				
4. TECHNOLOGY AND MATHEMATICS EDUCATION					
Introduction  Bernard Winkelmann	171				
The role of programming: Towards experimental mathematics Rosamund Sutherland	177				
Computer environments for the learning of mathematics David Tall	189				
The role of cognitive tools in mathematics education <i>Tommy Dreyfus</i>	201				
Intelligent tutorial systems  Gerhard Holland	213				
5. PSYCHOLOGY OF MATHEMATICAL THINKING					
Introduction Roland W. Scholz	225				
The interaction between the formal, the algorithmic, and the intuitive components in a mathematical activity  *Efraim Fischbein*	231				
From Piaget's constructivism to semantic network theory: Applications to mathematics education - A microanalysis Gerhard Steiner	247				
The Sociohistorical School and the acquisition of mathematics <i>Joachim Lompscher</i>	263				
Action-theoretic and phenomenological approaches to research in mathematics education: Studies of continually developing experts <i>Richard Lesh and Anthony E. Kelly</i>	277				
6. DIFFERENTIAL DIDACTICS					
Introduction  Roland W. Scholz	287				
Mathematically retarded and gifted students  Jens Holger Lorenz	291				

Т	Α	R	1	F	$\cap$	F	C	$\cap$	N	$\Gamma$	F	N	$\Gamma$ S	1

IX

461

Should girls and boys be taught differently?  Gila Hanna	303
From "mathematics for some" to "mathematics for all" Zalman Usiskin	315
7. HISTORY AND EPISTEMOLOGY OF MATHEMATICS AND MATHEMATICS EDUCATION	
Introduction  Rolf Biehler	327
The philosophy of mathematics and the didactics of mathematics Paul Ernest	335
The human subject in mathematics education and in the history of	
mathematics  Michael Otte and Falk Seeger	351
Mathematics in society  Mogens Niss	367
The representational roles of technology in connecting mathematics with authentic experience   James J. Kaput	379
8. CULTURAL FRAMING OF TEACHING AND LEARNING MATHEMATICS	
Introduction <i>Rudolf Sträßer</i>	399
Comparative international research in mathematics education David Robitaille and Cynthia Nicol	403
Cultural influences on mathematics teaching: The ambiguous role of applications in nineteenth-century Germany  Hans Niels Jahnke	415
Mathematics and ideology Richard Noss	431
Cultural framing of mathematics teaching and learning Ubiratan D'Ambrosio	443
LIST OF AUTHORS	457

SUBJECT INDEX